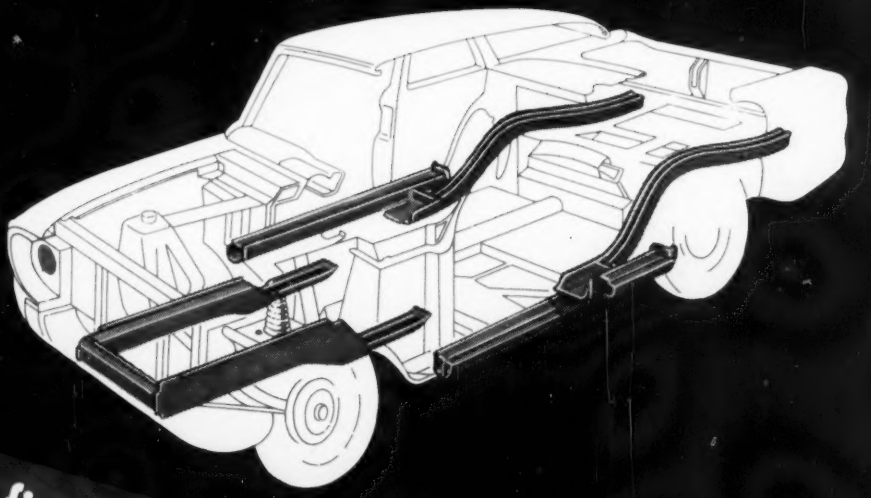
products finishing

NOVEMBER
1961

Ford fights corrosion of unitized bodies

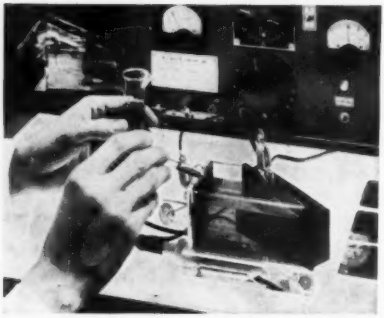


finishes on metal products

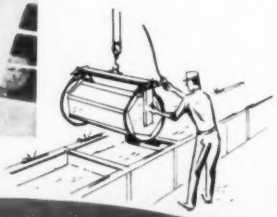
Plating Univac's Memory Drum

"Tri" and "Per" Degreasing Solvents

New ROHCO-Optimized Process



for Finest Barrel Plating in Zinc . . . at Low Cost!



"ECONOBRITE 117"

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- **Good Quality Deposits**
- **Greater Throwing Power**
- **Brighter Finish**

"Econobrite 117" offers you a balanced combination of qualities of premium-type processes concentrated in a single, one-shot brightener at low cost. It adds improved characteristics of solubility for speedier bath preparation, as well as bath stability and greater tolerance factors for wider variations of temperature, contamination, concentration, etc. Surpasses most commercial brighteners for brightness, throwing power and other process advantages. An all-over better zinc plate results without further bath attention or "boosting" — no need for excessive usage. ROHCO-Optimized "Econobrite 117" means finer quality zinc plating for your barrel lines both manual and automatic. Contact your ROHCO Distributor, or ROHCO Main Office. Ask for FREE Manual.

Nationwide Stockpoints

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"The right start . . . a better finish"
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ROHCO 20 XL and Super XL: World's leading cadmium brighteners.

ROHCO Cad-Sol: Add water for instant cadmium plating bath.

ZINC PLATING PRODUCTS

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Econobrite: Economical, bright deposits, suitable for post-plating dip.

Permo-Brites: Uniform, commercial finishes at lowest cost.

ROHCO 503: Most popular zinc brightener in plating.

ROHCO Zinc Purifier: Purges zinc plating baths — saves brightener.

ROHCO Zinc Sol: Add water for instant zinc plating bath.

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Rodip AL-44: Improves aluminum brite dips.

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Is your particular problem one of economy? Durability? Production bottle-neck? For a helpful answer, ask your local Oakite man. Or write for details to Oakite Products, Inc., 20 Rector Street, New York 6, N. Y.

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OAKITE

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SCIENCE

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Barrel finishing is best finishing

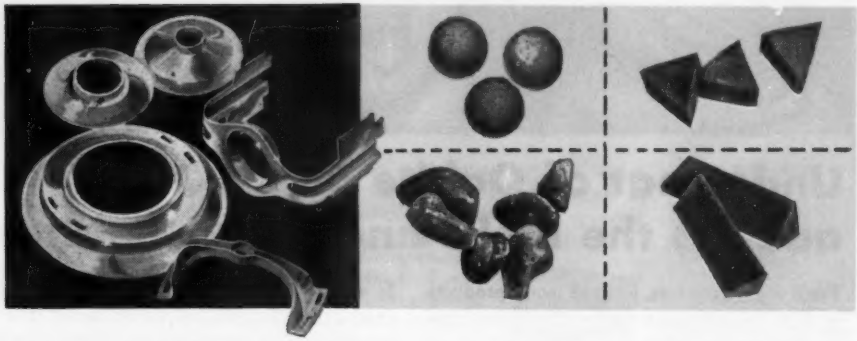
...to cut your assembling costs

Assembling finished parts is no longer the money-wasting problem it used to be.

Barrel finishing with Norton TUMBLEX abrasives is your modern solution . . . your surest, quickest way to remove burrs, heat scale, sharp or rough edges and other surface imperfections that keep complicated parts from fitting together smoothly and accurately.

We say *your* solution because the scope of TUMBLEX abrasives is virtually unlimited. The parts you finish . . . for assembling or for any other purpose . . . can be of any metal, ferrous or non-ferrous . . . or non-metallic including plastics and even woods . . . as hard as sintered oxides or soft as the softest machinable material . . . and their sizes can range from miniature to massive.

Barrel finishing with the right TUMBLEX abrasive not only improves your product appearance and quality — its speed and simplicity can increase your man-hour productivity and cut your cost-per-piece produced.



Without extensive hand-finishing and fitting, the assembly of these stamped component parts of an automotive thermostat was long and difficult. Barrel finishing with Norton TUMBLEX* abrasive proved unequalled for removing burrs that brought new speed to assembling.

Get complete proof. Send sample parts to our Sample Processing Department. We'll barrel finish, return samples and report the methods and abrasives you need for new production advantages. NORTON COMPANY, General Offices, Worcester 6, Massachusetts. Plants and distributors around the world.

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G-408

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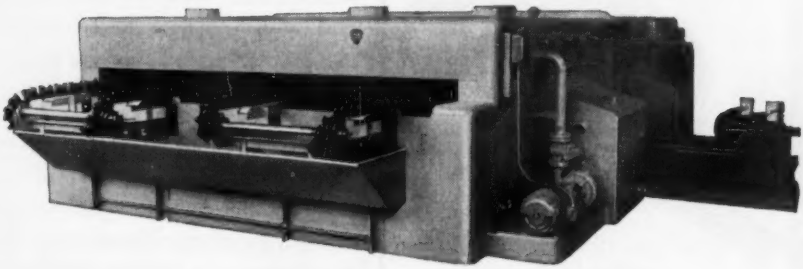
MACLEOD
CUSTOM-DESIGNED METAL CLEANING and FINISHING EQUIPMENT

Conveyor-Type WASH, RINSE, and DRY Machine



For Processing 12 ft. Aluminum Bar Stock

Manufactured for one of the nation's best known basic aluminum fabricators, this MACLEOD machine washes, rinses, and dries aluminum bar stock up to 12 ft. long, cleaning each bar so that it can be used in automatic screw machines without further processing.

As a means of keeping machine length to a space-saving minimum, bars are run crosswise, with each bar individually supported to prevent nicking or scratching. Machine operates at an average production speed of 12 bars per minute, at a mean conveyor speed of four f.p.m. Process cycle consists of 90 seconds hot wash, 45 seconds hot rinse, and 90 seconds high velocity air blowoff. Machine is gas-fired with complete safety equipment mounted on panels at the gas burners. Safety equipment features a low liquid level cutoff which automatically shuts off burners if solution level falls to a point where immersion tube is in danger of burning out.

This MACLEOD machine is designed with a number of leak-proof doors for easy access to spray risers and machine interior. In addition, automatic loading and unloading devices can be incorporated to permit attendant-free operation.

Write for complete information on the MACLEOD line of metal cleaning and finishing equipment.

Let MACLEOD engineers plan your metal cleaning installation.

The MACLEOD Company
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Deering Milliken

Matching Quantity and Quality

Milliken Buff Cloth Meets Challenging Finish Standards of Sunbeam Appliances . . . *such as this popular electric frypan.*

ELECTRIC FRYPAN
by
Sunbeam

. . . the new Model FP-5C series being introduced by the well-known Chicago firm.

An obvious result of setting high quality standards is the necessity of living up to them in volume production.

Sunbeam Corporation production men find that quality controls set for Milliken Buff Fabrics increase their assurance of consistent finishing performance in buffing operations. Their own plant experience has shown the Milliken Cloth Type which gives them best performance per cost dollar.

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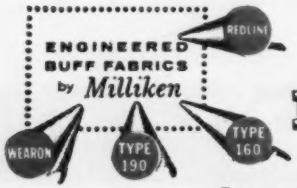
Send for this brochure on Milliken Buff Cloth Research.



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products finishing

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NBP

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contents

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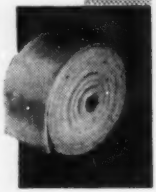
It's Real Economy

to use Bond®

TACK CLOTHS

Before Every Finishing Job!

SAVES WORK— SAVES TIME, TOO!



IN ROLLS
Cut off any size piece as needed.

No matter what surface you work with—whether metal or wood—you can't afford dust! It can be costly. Improve every finish by insuring a speck-free surface before every finishing job. A quick "once-over" with a Bond TACK CLOTH removes every speck of dust in seconds—insures a gleaming surface every time.

There's a big difference in TACK CLOTHS, too — that's why BOND produces four different meshes of cloth with several types of formulation to give you the cloth that best "fits" your special needs, whether wood or metal surfaces are involved.

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Size is 18"x36"—folded to 4½"x 18" or 9"x18" for ease of handling. Cut and folded—ready to use.

Packed in 150 yard rolls of 36" wide cloth or in handy cartons, as you prefer. Stays soft and tacky until the last bit is used up. Choice of Standard, extra Tacky or less Tacky—in WHITE or in GOLD.

Also Individually Packed in Glassine Envelopes — 144 to the carton.

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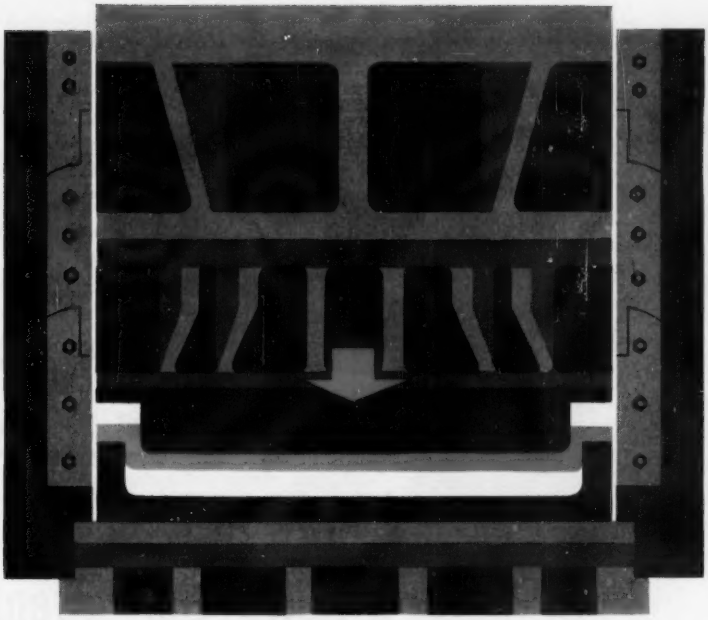

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Personalized service; Our nationwide staff of specialists recommend the equipment and chemicals for your line, help with installation and start-up, provide periodic service calls to keep your line running smoothly. Write or call for a consultation.

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The H-Gun principle utilizes a small, specially designed pre-orifice in combination with the airless spray tip. Only Spee-Flo can offer this patented exclusive feature.

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(Furnished For Rack On Finger Type Plating)

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Fast and Economical. The most versatile, most efficient machine ever designed for fast, low-cost plating of small and medium size parts.

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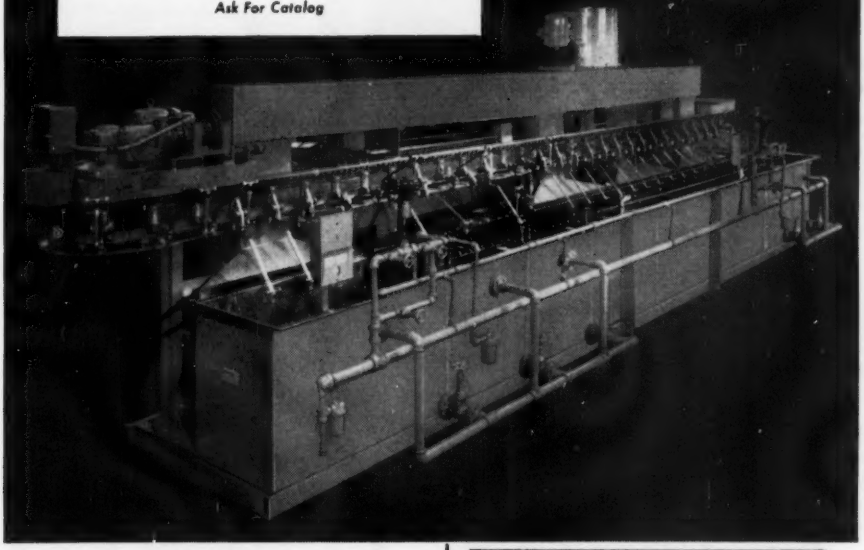

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Daw Jr. Automatic Plating Machine

Name.....

Title.....

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8 Million BTU....±3° F.

With This Despatch Quick Quench Radiant Tube Furnace

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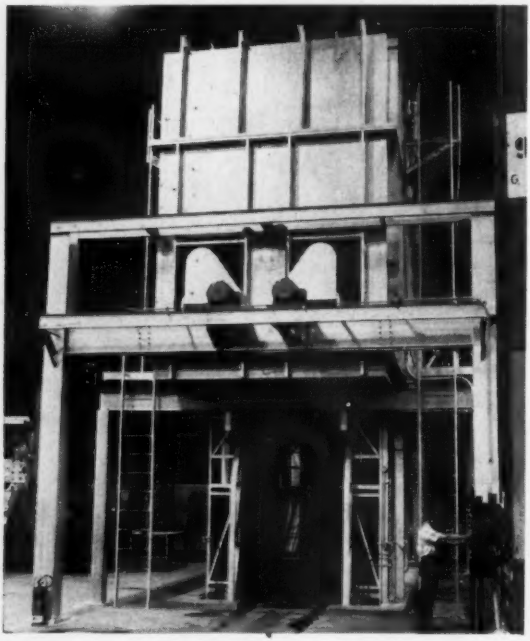

Our customer—a large west coast manufacturer has naturally been as pleased as we have been proud.

While it's impossible to guarantee we'll exceed specifications this much every time, we can assure you our equipment will exactly fit your needs. More than 50,000 satisfied customers prove our point.

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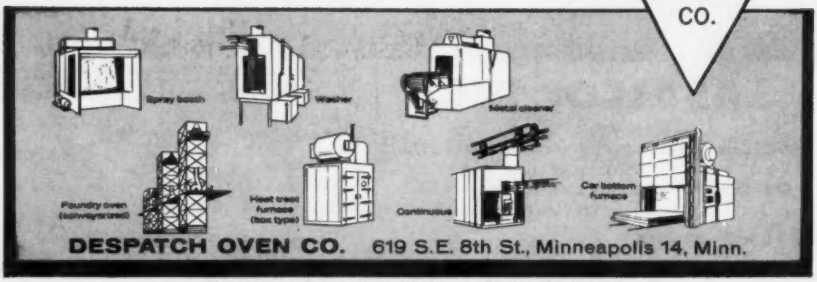

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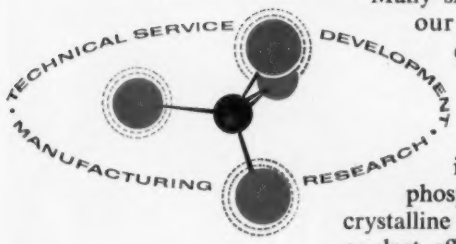
MORE PROTECTION AGAINST RUST... AND A BETTER BASE FOR PAINT

Effective rustproofing is the effective application and control of phosphate ions to protect metal surfaces. This can be done on the basis of soundly established principles of metal surface chemistry.

Our business is showing customers how to get improved rustproofing on their products. To help them, we have the largest research effort in the rustproofing field.

The symbol for our research, and the services we offer, is our trademark, the phosphate ion itself.



Many significant discoveries have come from our continuing exploration of ways to control the phosphate ion—to improve rustproofing systems and chemicals for our customers.

A recent example: Using our improved chemicals for production phosphating, you can produce a micro-crystalline paint base that will not crack, chip or dust off even if the metal is severely twisted and bent. This rustproof base holds all finishes, including the very latest acrylics.

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(A Division of The Lubrizol Corporation)
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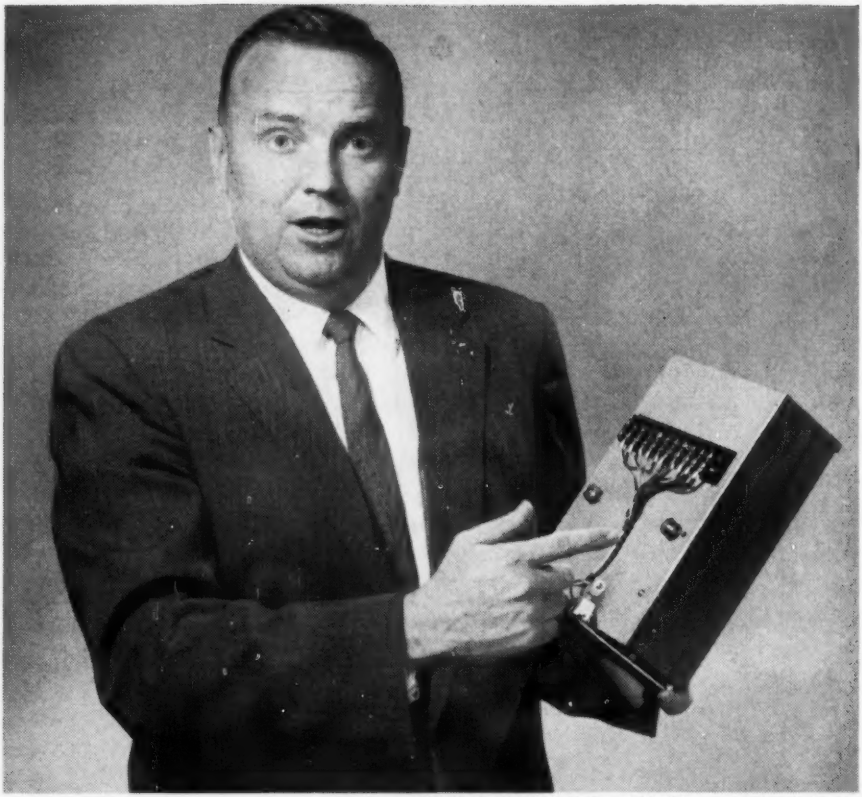

HENRY B. KOEHLER, H-VW-M's Manager of Electrical Sales

Now...in automatic plating rectifiers

A package of good news for platers!

It's the new *control package* from H-VW-M . . . and here's what it offers you:

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AVS or ACC. (automatic voltage stabilization, automatic current control) . . . with current limiting . . . are both available at flick of selector switch.

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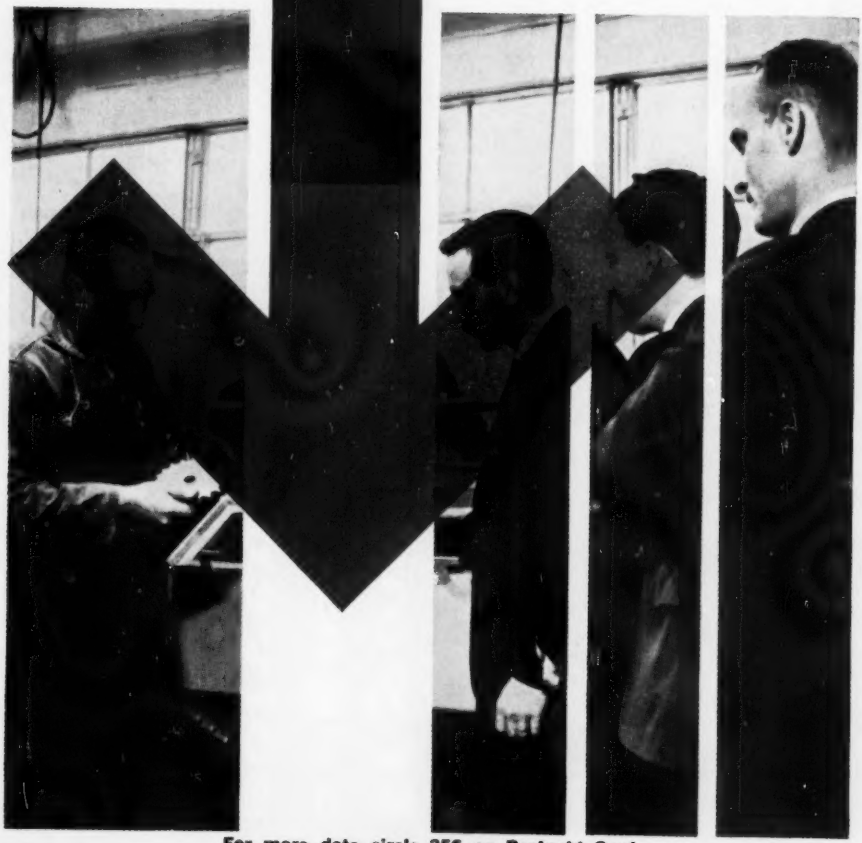
to your barrel finishing team

Your Carborundum Barrel Finishing Specialist can become an important means of cost reduction in your plant. He is trained in the most modern barrel finishing techniques—Carborundum's **Carbotrol 7** system. He has had practical experience in many plants where he has helped demonstrate that barrel finishing, properly applied, can produce outstanding results at low cost. He can advise you on the correct equipment and methods for deburring, grinding, polishing, burnishing, radii-forming, cleaning, descaling and many other operations which you might require. Put this specialist in your finishing picture...phone your local Carborundum distributor or district office.

CARBOTROL 7—CARBORUNDUM



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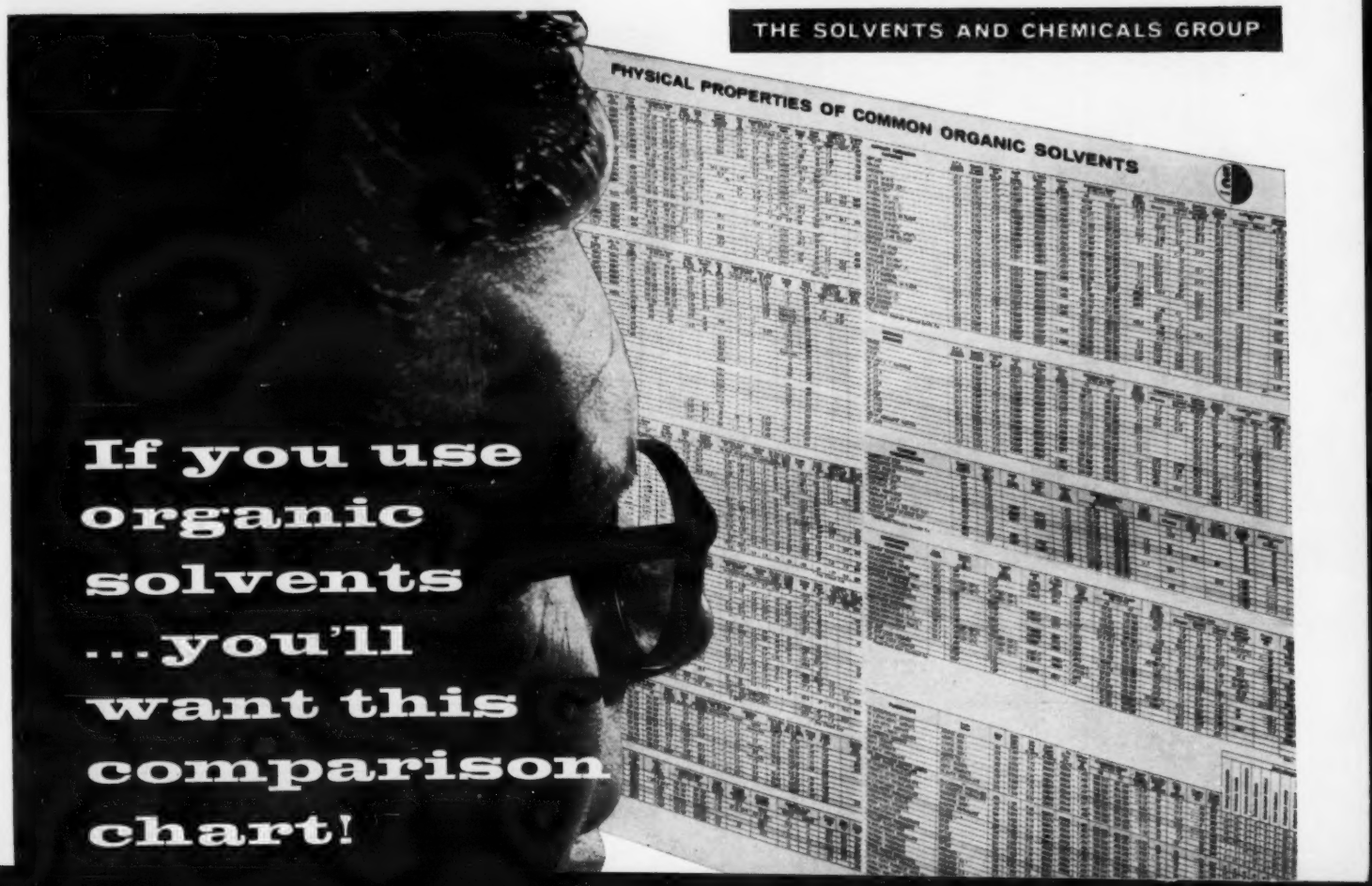
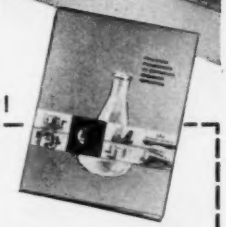

THE SOLVENTS AND CHEMICALS GROUP
PHYSICAL PROPERTIES OF COMMON ORGANIC SOLVENTS
If you use organic solvents ...you'll want this comparison chart!

It's yours for the asking!



Brand new edition . . . an extremely useful chart that provides a comparison of the physical properties of commercially available common organic solvents. It's a "must" for anyone using these products. In the chart you'll find general definitions of the terminology used, technical data on the physical properties based on producers' current specifications . . . all in handy, reference form! Get your copy simply by mailing the coupon at right . . . or through your local SOLVENTS AND CHEMICALS GROUP plant. Write today.

Mail coupon for your FREE copy!

THE SOLVENTS and CHEMICALS GROUP

Dept. PF-11 2540 W. Flournoy St. Chicago 12, Ill.

Please send me a copy of the new chart on the Physical Properties of Common Organic Solvents.

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

SC Solvents Chemicals Group Member

THE SOLVENTS AND CHEMICALS GROUP, 2540 W. FLOURNOY STREET, CHICAGO 12, ILLINOIS

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for paint spray booths

PAINT GUARD

a new, improved coating

A ten minute demonstration will show you that PAINT GUARD is:

ready for use without dilution
easy to apply and remove
has high light reflectance but
low specular gloss
won't pick up on workers' shoes

In addition, PAINT GUARD is economical, non-combustible, and suitable for sandwiching.

For more information or the demonstration that will solve your spray booth coating problems, write or phone one of the offices listed below.

KELITE CORPORATION

● Los Angeles 12 ● Chicago 45 ● Berkeley Heights, N. J.

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CONSISTENT HIGH QUALITY PLATING WITH TESTED, PROVED MATERIALS

Use these tested, proved-in-use chemicals and anodes for fast, economical, always consistent quality plating:

High efficiency anodes in brass, cadmium, copper, lead, nickel, tin, tin-lead and zinc.

Asarco-Max copper anodes and triple-life Conducta-Core lead anodes.

Asarco nickel salts of high purity and uniformity.

Brighteners: Cadmax (cadmium), Zimax (zinc), Levelmax & Nimax (nickel).

All have set new industry performance standards.

For full information on plating materials and expert help on individual problems, call or write: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, N. Y., RE 2-9500, or call our nearest sales office or Federated plating materials distributor.

In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

ASARCO

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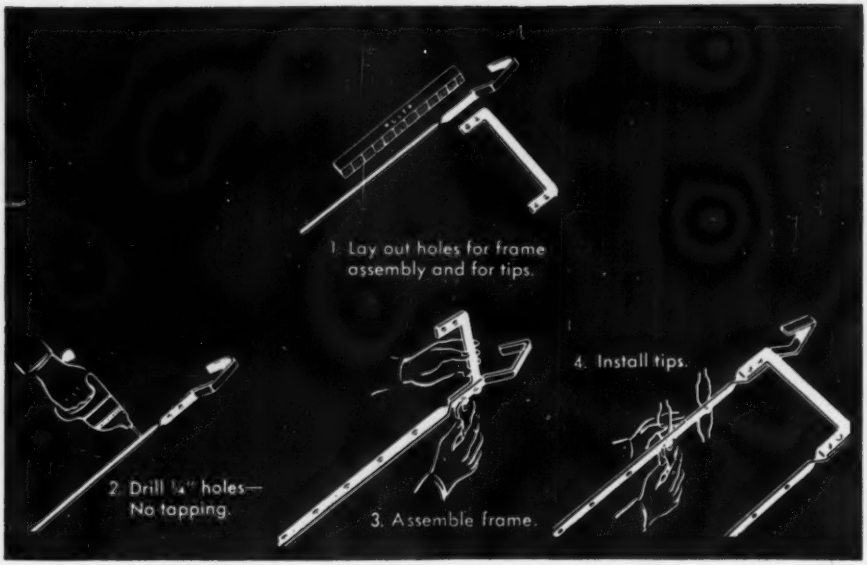
FEDERATED PLATING SUPPLIES

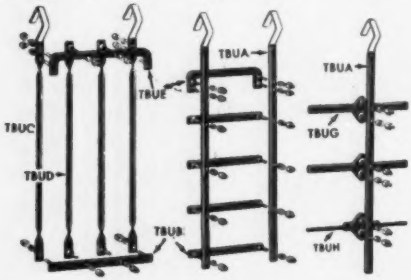


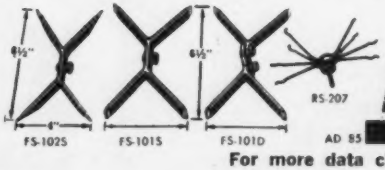
Patent No. 2,820,757

BELKE THINKER BOY RACKS

Pre-Insulated Parts are quickly assembled

The quickest way to get racks. Many times a week platers with rush jobs pick up Thinker Boy Members from our stock, assemble the racks and get several hours of actual plating production all in the same day.





FLEXIBILITY UNLIMITED

With a minimum supply of assorted members you can

Replace broken tips; keep racks at 100% capacity.

Convert rack frames to other styles as needed

Send for the Thinker Boy Instruction Manual.

See how easy it is to assemble completely insulated racks of your own design. Get acquainted with the marvelous assortment of THINKER BOY TIPS.

Belke MANUFACTURING COMPANY
947 N. Cicero Ave., Chicago 51, Ill.
EVERYTHING FOR PLATING PLANTS

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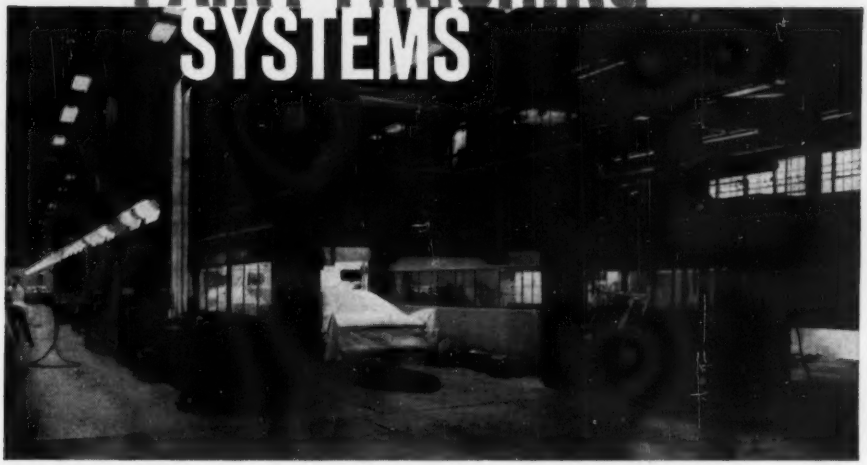
ROSS

COMPLETE PAINT FINISHING SYSTEMS



Everything from METAL CLEANING through DRY-OFF on to FLOW COATING into SOLVENT VAPOR ENCLOSURE to FLASH OFF into PRIME COAT BAKE OVEN on to FINISH COAT then to FINISH COAT BAKE OVEN into COOL on to INSPECTION

The whole system is an engineered combination of the most modern ROSS components including metal preparation units, spray booths, flow coat units, dry-off ovens, air make-up units, air heaters, conveyors and air conditioning units. Now, a single responsibility for the entire system—engineered, designed, constructed and erected by J. O. Ross Engineering. For more information send for Paint Finishing Bulletin No. PF 401.

J. O. ROSS

J. O. ROSS ENGINEERING/a division of Midland-Ross Corporation
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FREE REPRINTS

of popular articles from PRODUCTS FINISHING

Tin Plate Replaces Solder Coat on Transistor Shells

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Definition of terms, hints for improving results.

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Decorative painting of automotive and appliance parts . . .

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Tips on employing buffs, compounds, and people efficiently . . .

How Boeing Finishes the B-52

Process details for cleaning, treating and painting aircraft parts and assemblies . . .

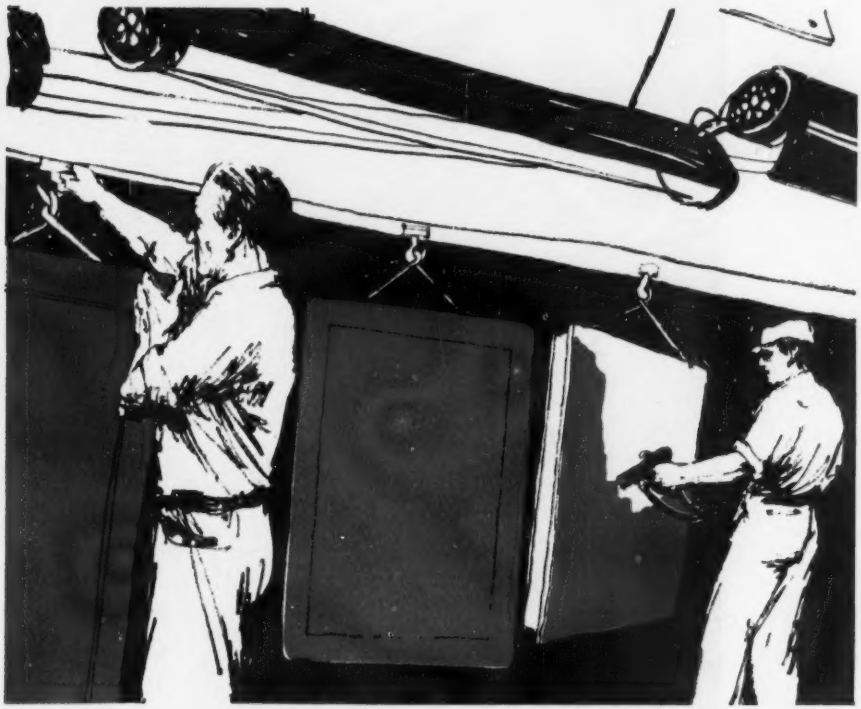
Jelled Plating Solutions for Barrel Plating Precision Parts

Colloidal agents added to conventional plating baths keep parts from nicking one another . . .

To get a copy of any article listed here, write on company letterhead to

PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio

What's News in Enjay Resins...



Buton®-based lacquers offer fast drying times...high solids...chemical resistance

Easy to apply . . . quick to dry, Buton 300-based lacquers offer many advantages for furniture and household cabinet coatings. Their short drying times are comparable to other fast-drying lacquers. The high solids content of Buton lacquers at spray viscosity provides marked advantages. A Buton formulation can be sprayed at over 30 per cent solids content. The combination of high spray solids, plus the high bulking value of Buton lacquers, results in greater one-coat film build. This means fewer applications and less sanding.

Chemical spot tests show that Buton-based lacquers are resistant to cold or boiling water, alcohol, grease, soap, and dilute caustic. They can be formulated in a wide gloss range, and are available in clear or true tint colors. For more information, contact Enjay at 15 West 51st Street, New York 19, New York.

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

ENJAY

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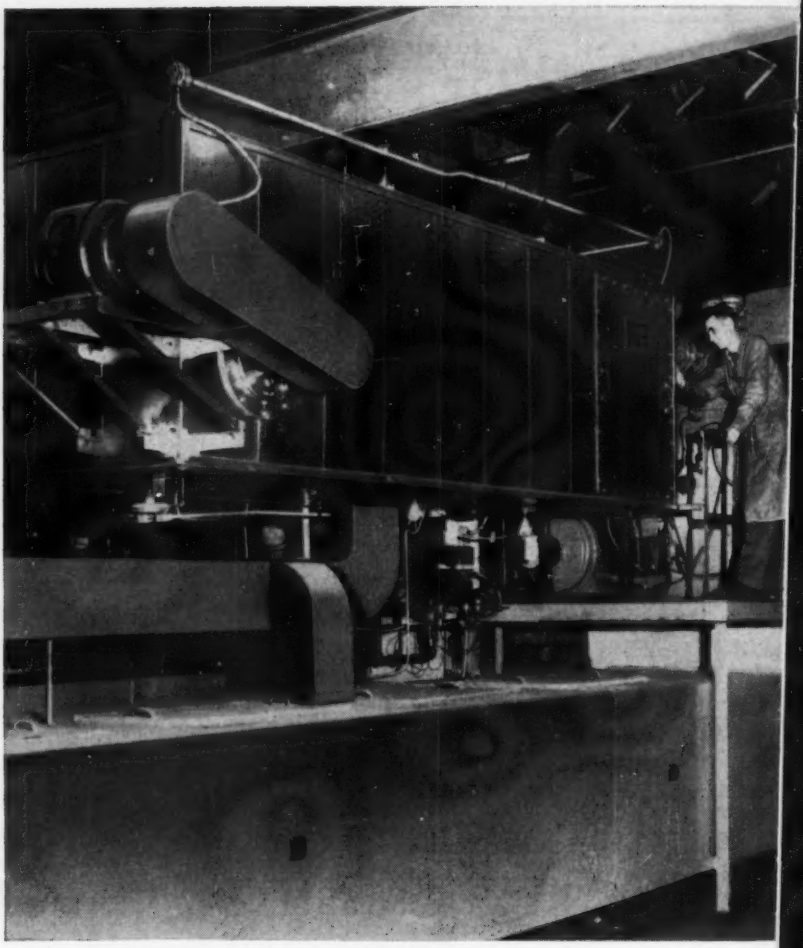
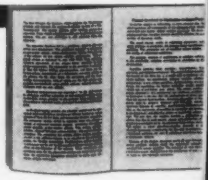


The Catalytic system on this continuous metal strip coating oven converts objectionable exhaust fumes into valuable heat energy which is released in the oven.

For more details *on the economies possible write Dept. B for this brochure. Or, give us a few facts on your oven exhaust problem so we can make specific suggestions . . . to you, or your equipment builder.*



That odor you smell is money escaping!

The odorous exhaust fumes coming from your ovens are probably costing you much more than the good will of your employees and neighbors. Usually these odors represent a wasted asset . . . a missed opportunity to lower your costs . . . through conversion of fumes to BTU's for return to the oven, use in plant processes, or as a supplement for heating plant make-up air.

Thousands of installations . . . on ovens and dryers for wire enameling, paint baking, metal decorating, paper printing and impregnating, organic coating and curing and many others . . . have proven the economy and feasibility of using objectionable oven exhaust vapors as money-saving fuels through Catalytic Combustion. In this proven process, all-metal catalysts and catalytic systems oxidize these gases by *low temperature, flameless combustion* to give you usable energy and an odorless, colorless discharge. Incidental benefits often include reduced fire hazards, simplified cleaning maintenance, healthier working conditions . . . and better community relations.

CATALYTIC COMBUSTION CORPORATION

4725 Fourteenth Street • Detroit 8, Michigan

A SUBSIDIARY OF UNIVERSAL OIL PRODUCTS COMPANY

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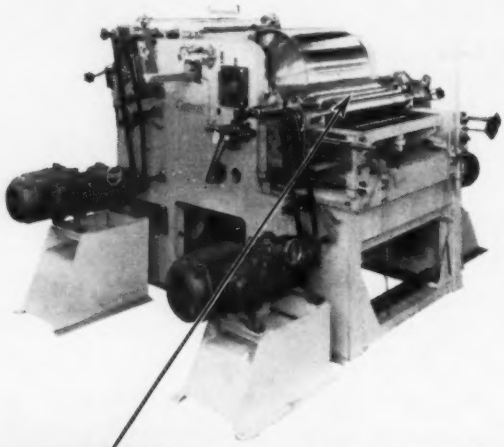
Another GASWAY strip-coater FIRST



HERE'S THE SECRET OF HOW THIS PRECISION COATER SHAVES DOWN STRIP COATING COSTS!

PERFECT CONCENTRICITY enables Gasway coaters to precisely control film thickness in continuous strip coating operations. This is because rolls are precision ground on live centers and actually revolve on the same centers in the coater. The perfect concentricity results in the most highly accurate metering of film thickness available today. This feature enables you to get uniform coating results with minimum paint film thickness. Thus large savings in paint costs are made every operating hour.

Running the coating rolls on centers instead of journals also permits changing rolls in a minute or less. This means less down time and practically eliminates wasted strip.

Each roll is driven by an independent variable speed drive not connected to the frame. This, plus chatterless multi-groove drive, eliminates vibration in the coater and produces smoother finishes.

Get all three important results by using the new Gasway precision coater: Cut down paint costs . . . Get smoother finishes . . . Eliminate excess waste and down-time.

Get all the facts about this superior strip coating machine.

SEND FOR COMPLETE INFORMATION

. . . Complete kit on Gasway strip coating features descriptive literature, case histories and pertinent detailed information.

Send for your copy today.

GASWAY CORPORATION
6363 N. Ravenswood Ave., Chicago 26, Illinois
Phone: SHeldrake 3-1414

Look to Gasway for experience and know-how in high production strip coating.

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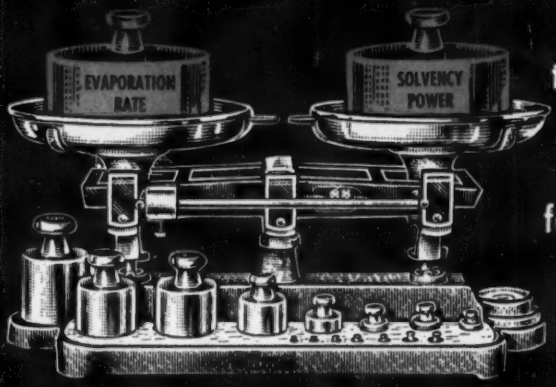
BALANCE & UNIFORMITY



the measure of GOOD SOLVENTS for Quality Product Finishing

In applying product finishes of lasting quality, solvents and thinners are important out of proportion to their cost. For this reason it pays to use APCO Solvents. They give you the balance you need between evaporation rate and solvency power... and uniformity assured by a single source of quality crude, specialized equipment and precise manufacturing control.

Your APCO Solvents man offers the right solvents for your specific operation, the services of our technical laboratories, and prompt shipment of test samples. We will supply his name on request.

TROLUOIL • DRYOLENE (VM&P) • APCOTHINNER • NO. 10 MINERAL SPIRITS

Other Solvents to Meet Your Specifications

APCO
INDUSTRIAL SOLVENTS

APCO OIL CORPORATION

OKLAHOMA CITY, OKLAHOMA

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SAVE with SOAP COATING by Cincinnati

. . . allows dollar per part material saving!

A well-known Chicago manufacturer of large formed metal parts reports big savings made possible by a *Cincinnati* machine which cleans and soap coats stock for deep drawn parts. For example, on bath tubs which are to be porcelain enameled, soap coating before drawing makes possible the substitution of hot rolled steel for the formerly used vitreous steel stock; the saving is $1.00 per part!

The *Cincinnati* Soap Coater cleans the stock . . . applies a uniformly thick coating of drawing compound . . . dries it . . . all automatically.

Sheets are ready for immediate or delayed use without messy manual swabbing. Uniformity in drawing — longer die life—high quality in finished parts — smooth production flow are the money-saving results.

Whether your production requires soap coating or any cleaning and finishing operation . . . *Cincinnati* specialists in savings will show you the way to increased production—better production — at lowest possible costs! Call your representative or write: Cincinnati Cleaning & Finishing Machinery Co., 2008 Hageman St., Cincinnati 41, Ohio.

Cincinnati

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Sunbeam

brightens any table with Mutual Chromic Acid

This Coffeemaster is typical of the handsomely and durably finished fine appliances made by Sunbeam Corporation, Chicago, Ill. They owe their sparkling good-looks to Sunbeam plating skill and Mutual® Chromic Acid.

Mutual Chromic Acid is always 99.75% pure—or better. Its low sulfate content (less than 0.1%) makes it easier for you to control the acid-sulfate ratio of your plating bath. This safeguards against plating difficulties—and expensive rejects!

To learn more about Mutual Chromic Acid and the Mutual line of chromium chemicals . . . uses, properties and comprehensive technical data . . . write for your free copy of Solvay's 80-page Technical Bulletin, "Chromium Chemicals." Our Technical Service Staff will also be happy to answer your questions. State whether you would like to have a representative call.

SOLVAY® PRODUCTS FOR PLATERS

Mutual Chromic Acid • Solvay Caustic Soda • Solvay Hydrogen Peroxide • Solvay Methylene Chloride • Mutual Sodium Chromate • Mutual Sodium Bichromate • Solvay Soda Ash

Allied Chemical

SOLVAY PROCESS DIVISION
61 Broadway, New York 6, N.Y.

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NOW A-F ENGINEERS A SYSTEM

FOR PROCESSING STEEL OR ALUMINUM COIL STOCK

If your production plans call for the complete processing of aluminum or steel coil stock, ask A-F to design an efficient, cost-saving, fully coordinated system for you.

Since 1901, leading manufacturers have looked to Alvey-Ferguson for special equipment to solve their metal products handling problems. A discussion will quickly prove that an A-F Complete Cleaning and Finishing System can be engineered to speed production, improve quality . . . and reduce operating and maintenance costs in *your* plant.

Write for new illustrated folder.

A-F

A-F *ENGINEERED*

Cleaning and Finishing Equipment
Plant-Wide Conveying Systems

THE ALVEY-FERGUSON CO. • 656 Disney Street • Cincinnati 9, Ohio

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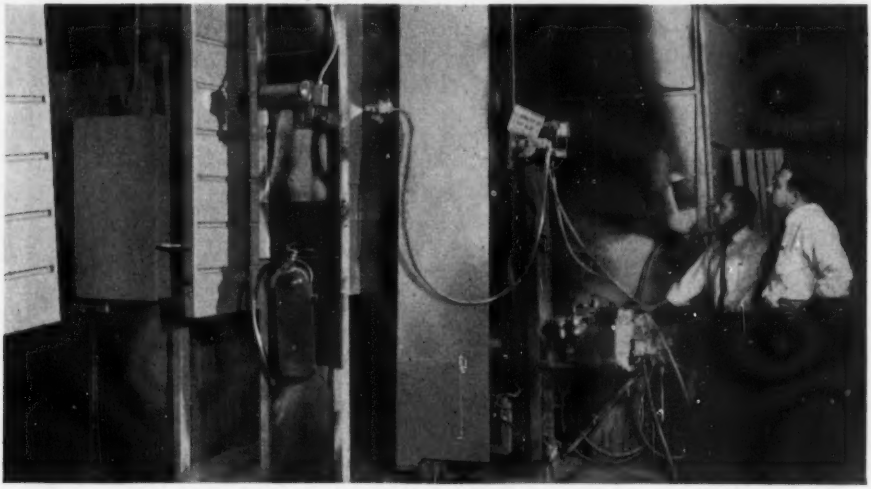
ASK THE MAN WHO USES NORDSON AIRLESS

"We cut our paint bill more than $12,000 the first 3 months!"

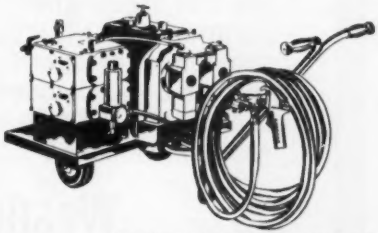


Mr. Briggs, left and Mr. Gering of Berry Door Corporation watch automatic spraying of steel garage doors

"Paint costs were getting out of hand. The sales department wanted a better finish on our metal garage doors, but we were also under pressure to hold the line, costwise. After a careful investigation we switched to the Nordson Hot Airless Spray System. We effected 45 percent savings in paint and at the same time increased coverage very substantially and improved appearance. Total savings are now running better than $4,000 a month.

This is a direct report from Mr. C. T. Briggs, Chief Engineer, and Mr. L. N. Gering, Production Manager of the Berry Door Corporation, Birmingham, Michigan, world's largest manufacturer of metal garage doors.

If you spray varnishes, paints, lacquers or other industrial coatings, it will pay you to find out if the Nordson System can provide savings and improve quality for you. Write Nordson Corporation, 88 Jackson Street, Amherst, Ohio.



Nordson Model 15000 Hot Airless Spray Unit is the most versatile "paint shop" developed for American industry.

NORDSON•ORIGINATORS OF AIRLESS SPRAY

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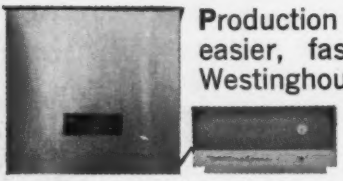
ULTRASONIC EQUIPMENT BY WESTINGHOUSE

MORE CLEANING POWER PER WATT . . . HIGHEST PRODUCTION LINE RELIABILITY



Production line cleaning jobs are easier, faster with high power Westinghouse ultrasonic cleaning equipment. Solid-state ultrasonic generators achieve greater reliability, higher efficiency, and take less space. The new Westinghouse Magnapak transducers deliver more usable power than other transducers for the same electrical input. Tank sizes: 1½ to 600 gallons, power ranges from 250 to 25,000 watts. *Equipment is backed by local service—nationwide.*

Ask the Westinghouse Industrial Electronics Department, 2519 Wilkens Avenue, Baltimore 3, Maryland, for specific information, or a demonstration of how modern ultrasonics can solve *your* cleaning problem. *You can be sure . . . if it's*

Westinghouse

J-39031

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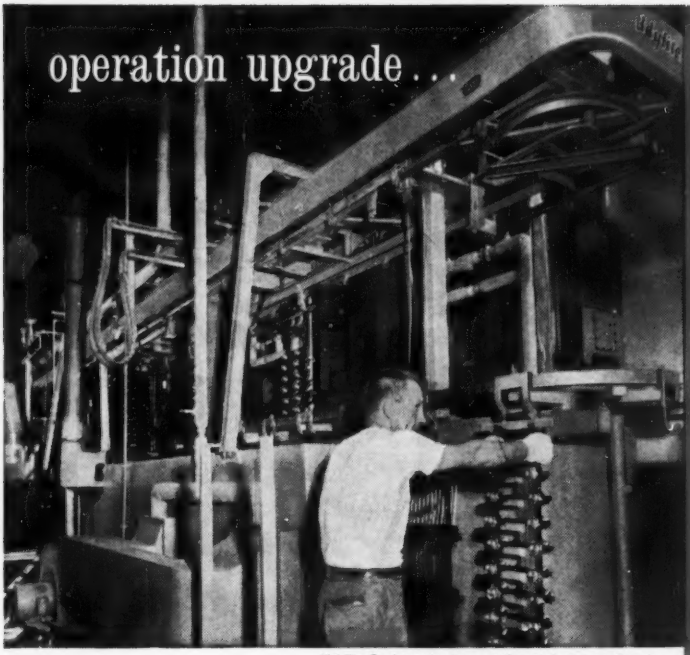

Udylite Cyclemaster in operation at American Standard Plumbing and Heating Division, Cincinnati, Ohio

udylite

CYCLEMASTER has the answer

This Udylite Cyclemaster, which is another way to say low cost automation, represents six important areas of improvement in American Standard's plating production.

- quality control to meet their most exacting top standards
- production volume far exceeding their expectations
- nearly 50% savings in floor space used for the operation
- almost total elimination of rejected pieces
- ultra-sonic cleaning to eliminate complicated de-greasing
- Plastisol coated tanks for minimum maintenance . . . long life

Learn how Cyclemaster can perform with equally promising revisions of your profit picture while improving your product whatever it may be. To find out how so *much* can be accomplished for so *little*, ask your Udylite representative, today!

Udylite

The Udylite Corporation
Detroit 11, Michigan

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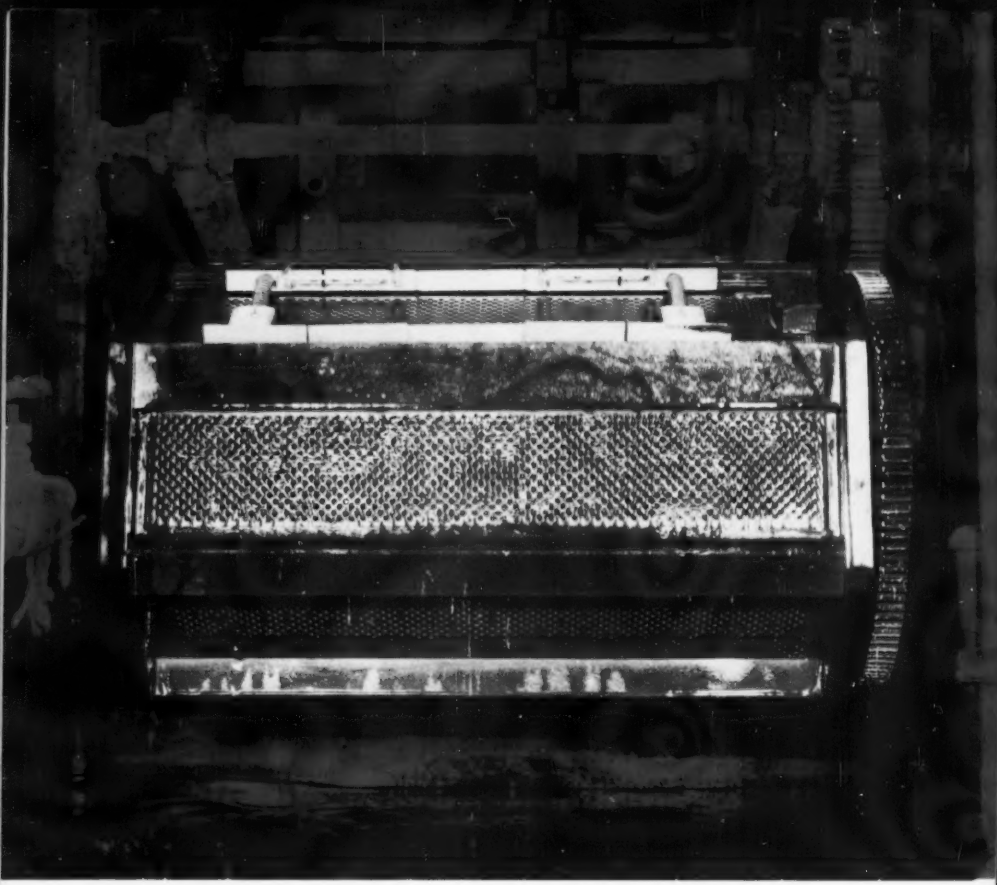
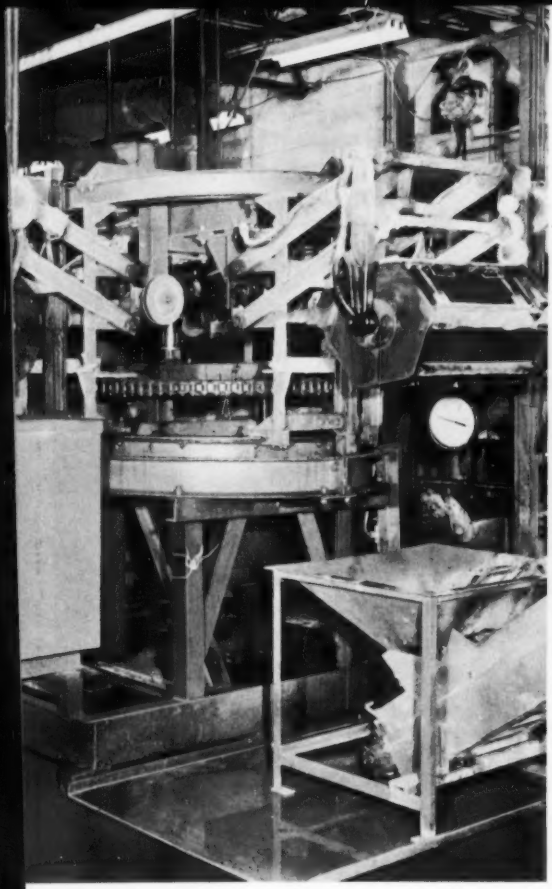


7 years of high-production service!

Udylite tempron plating cylinders take 200-pound loads, 10 times a day . . . year after year.



"Udylite Tempron Plating Cylinders give us more for our money: economical performance, low maintenance and extra long service life," says Al Betteley of the Bellevue Plating Co.

Al Betteley, Vice President and General Manager of Bellevue Plating, Detroit, Michigan, is more than satisfied with the performance and economy records set by Udylite Tempron Cylinders on his high-volume zinc plating operation. ■ "Rugged construction, maximum resistance to heat and abrasion, plus a design that practically eliminates maintenance problems, have made these Tempron Cylinders real cost-cutters in our plant," states Mr. Betteley. ■ Specializing in nut, fastener and automotive component plating, Bellevue Plating now has Tempron Cylinders in operation on two automatic barrel machine lines. Up to 200 pounds of parts per cylinder are processed at temperatures to 212° F.—then, they are immediately placed in a cold rinse. Lack of warping or softening at this great temperature variance makes Tempron Cylinders ideal for the plating job. ■ Look into the long range advantages of Udylite Tempron Cylinders on your plating and processing operations. You'll discover, just as Bellevue Plating has, that they'll give you more for your money year after year. Call your Udylite Representative today. Or, write direct for complete information:

Udylite

THE UDYLITE CORPORATION
DETROIT 11, MICHIGAN

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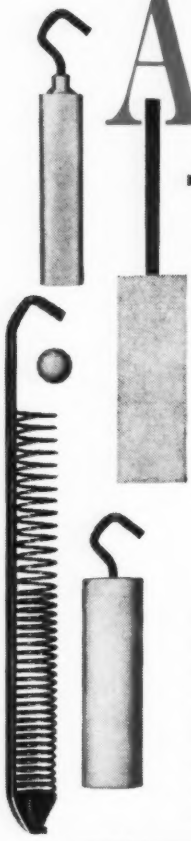
YOUR BEST SOURCE FOR ZINC ANODES

udylite



The Udylite Corporation can readily fill all your zinc anode requirements from a network of warehouses across the country. Anodes are immediately available for shipment in these popular shapes and sizes:

BALL ANODES—2″ diameter.

OVAL ANODES—1½″ x 2½″ cross section; from 12″ to 36″ long.

OVAL ANODES—1½″ x 3½″ cross section; from 12″ to 32″ long.

HEX ANODES—1¾″ x 2¾″ cross section; from 12″ to 36″ long.

SLAB ANODES—1″ x 4″ cross section; from 12″ to 42″ long.

Oval, hex and slab anodes are available drilled and tapped or with steel strap hook through entire length of anode. Udylite anodes have the highest purity available, are of a special high grade zinc and meet all government specifications. Ball anode containers are manufactured in both straight and curved types. Call your Udylite representative the next time you order zinc anodes. Or, order directly from:

Udylite

world's largest plating supplier

THE UDYLITE CORPORATION

Detroit 11, Michigan

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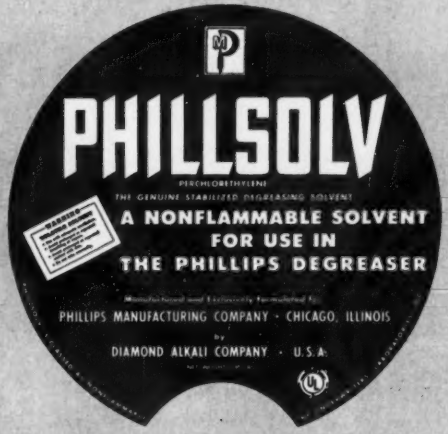
P/P

Phillips

ALL-ELECTRIC

PERCHLORETHYLENE DEGREASERS

- REQUIRE NO WATER
- REQUIRE NO DRAINS OR CONDENSATE RETURNS
- REQUIRE NO UTILITY CONNECTIONS EXCEPT ELECTRICAL
- RECLAIM THEIR OWN SOLVENT AUTOMATICALLY



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Here's why:

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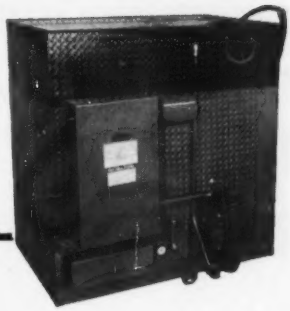

PHILLIPS ALL-ELECTRIC vapor degreasers, designed for use with perchlorethylene, clean soiled parts faster and cost less to purchase and operate because:

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HEAVIER VAPORS, 5.8 times heavier than air, reduces solvent loss from escaping vapor; reduces contamination of the atmosphere.

HIGH DENSITY AND HIGH GRAVITY VAPORS permit use in PHILLIPS ALL-ELECTRIC vapor degreasers without costly cooling coils and/or water jackets to control vapor levels.

Write for Bulletin 25 for all the facts on degreasing with PHILLIPS ALL-ELECTRIC degreasers and PHILLSOLV perchlorethylene.

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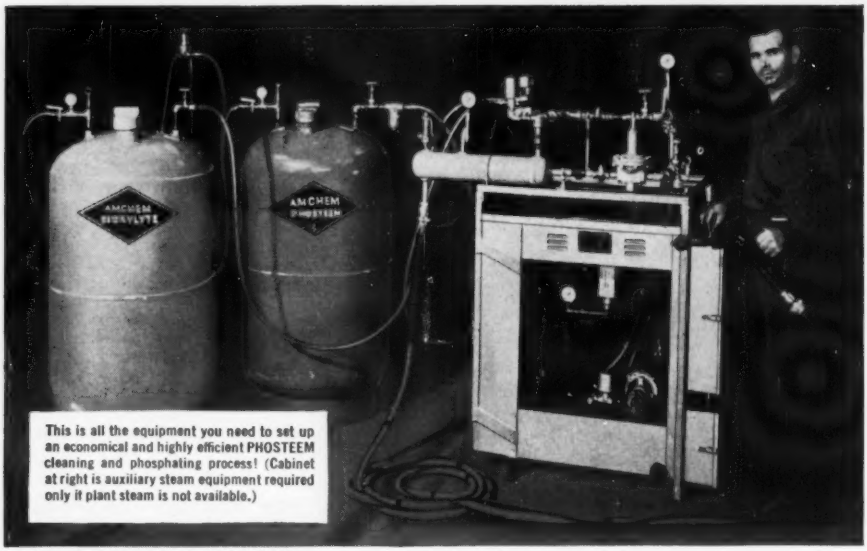

This is all the equipment you need to set up an economical and highly efficient PHOSTEEM cleaning and phosphating process! (Cabinet at right is auxiliary steam equipment required only if plant steam is not available.)

Photo courtesy of the Electro Steam Generator Co.

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the PHOSTEEM process cleans and phosphatizes metal surfaces simultaneously, even provides a final acidulated rinse, closely duplicating the quality obtained with conventional power spray washers. It increases corrosion resistance, adds paint bonding durability to any size or shape of virtually any metal alloy product . . . with coating uniformity far superior to hand and conventional steam cleaning.

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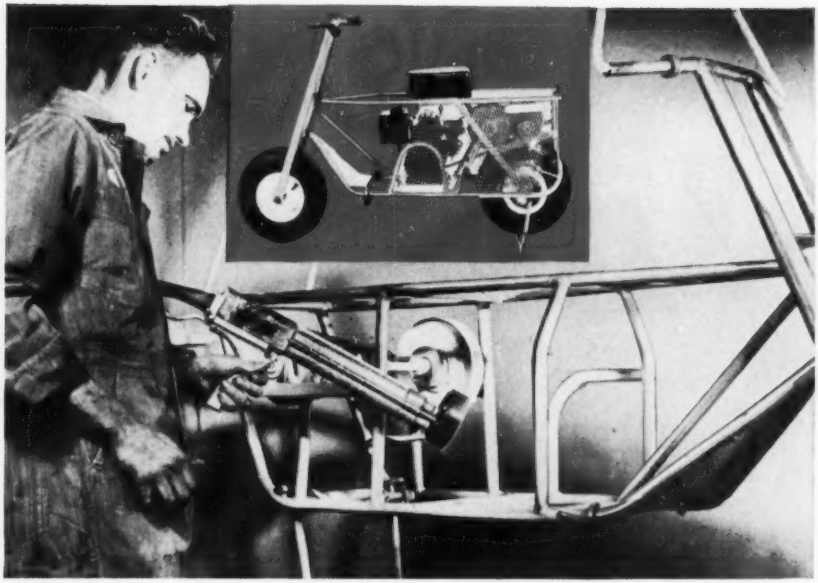

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RANSBURG

The predominately tubular construction of the Tote Gote makes it particularly adaptable for painting with the Ransburg No. 2 Process Hand Gun. That's because the "wrap-around" feature of electrostatic painting covers all such areas from one side only.

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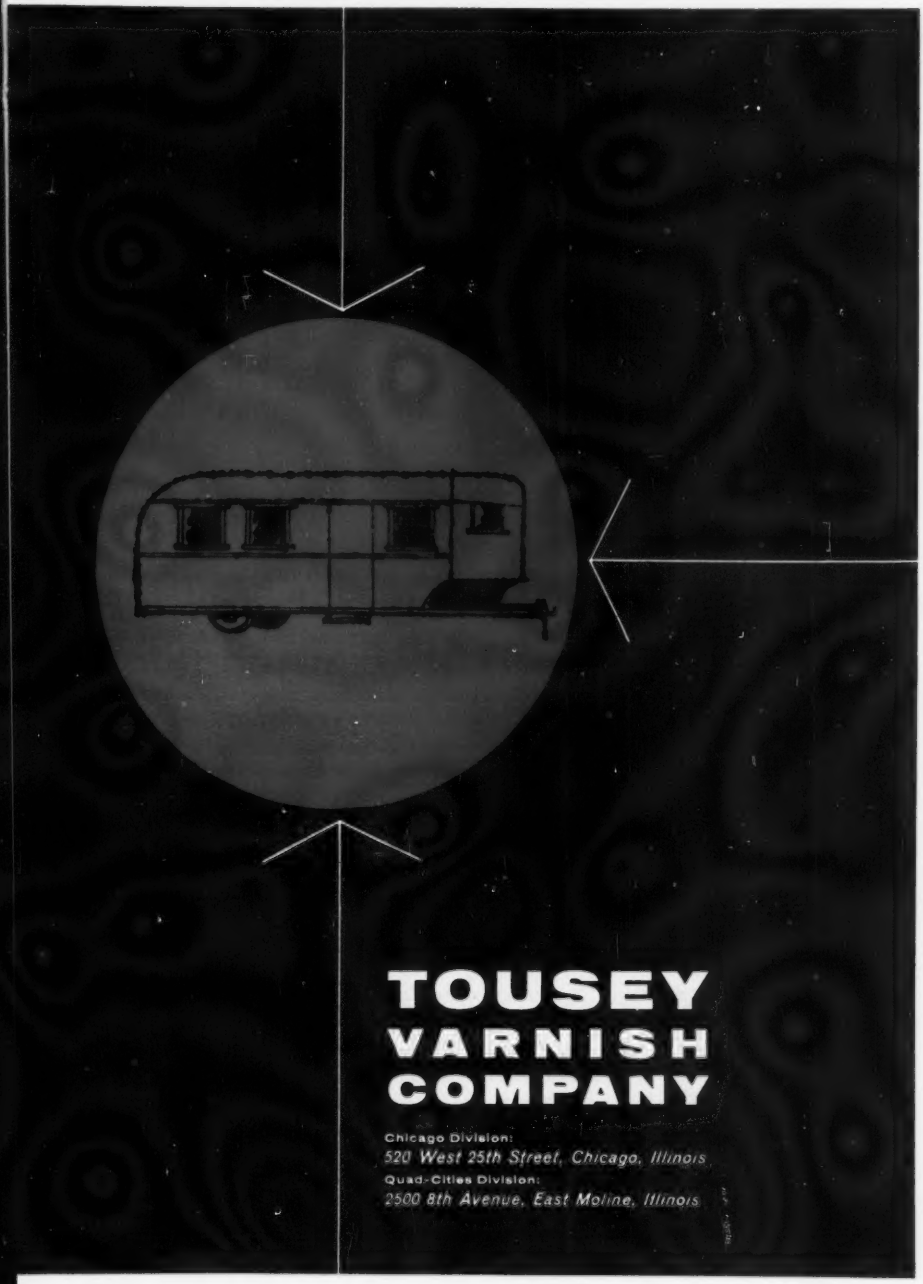
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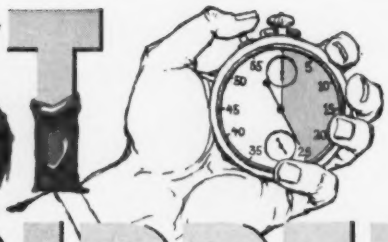

✓ **FAST, CLEAN WORKING**...unlike caustics or strong acids, these strippers do not dissolve or decompose enamel or lacquer. These strippers break the bond between the metal and the organic coating. Loosened coating then slips off in sheets or shreds.

✓ **NON-CORRODING**...our strippers do not attack aluminum, zinc, ferrous metals or any other metal or alloy.

✓ **CONVENIENT**...stripped metal may be rinsed with water, dried and refinished immediately.

LEA COLDSTRIP

1. Requires no dilution. Use full strength.
2. No heating required. Use at room temperature.
3. Although toxicity is low, care should be taken to avoid contact with the skin.
4. Minimum ventilation required.
5. Can be strained for continued use.
6. Surface of Coldstrip is self-sealing (reduces evaporation).

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Maximum dilution should be 1 part Synstrip to 6 parts water.

2. Can be used cold or heated. Heating to temperature from 160° to 200°F. cuts stripping time.
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4. Heated solution requires ventilation to remove fumes.
5. Can be strained for continued use.
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Send for complete technical information on the fast working strippers.

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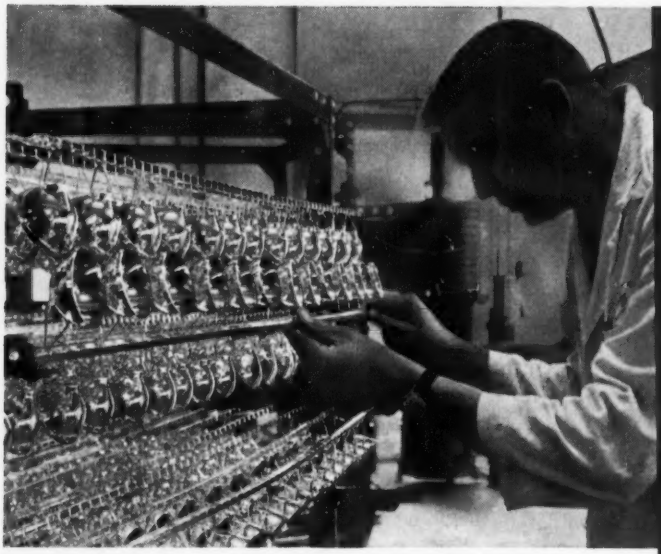

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THIS MONTH IN PF...

TRI AND PER in the title on pages 44-45 doesn't mean we're trying to quiet the cat. It's our way of abbreviating two long pieces of chemical terminology —trichlorethylene and perchlorethylene. Both are important cleaning solvents and this article by graduate student Richard C. Fullerton describes properties and uses of these volatile metal cleaners.

THE WORKER ON PAGE 52 is observing the operation of an automatic machine for bright-pickling magnesium. The article beginning on the same page tells how Shwayder Brothers brightens and improves corrosion resistance of magnesium extrusions for luggage closures.

WE CAN ALWAYS PULL THE PLUG. That's how one engineer described his ultimate weapon against a machine such as the Univac, which seems to be doing more and more human things. A finishing process that's given an important boost to computer manufacture is described in an article that begins on page 59.

FUNERAL CEREMONIES HAVE BEEN HELD for zinc by its competitors several times in recent years. But finishing engineers always seem to rediscover some marvelous facet of this old reliable standby and it jumps from the grave before the ceremony can be completed. An extensive test program recently completed by Ford Motor Company is a good example of this phenomenon. Of all the exotic ways considered for improving corrosion resistance of unitized bodies, hot-dipped zinc (galvanize) won out in the end. Ford's method of arriving at this conclusion is described by Ford Executive Engineer John C. Widman beginning on page 64.

SCRATCHES OFTEN CAUSE REJECT TAGS in finishing shops. But if you produce enough scratches, people like them. The satin finish has become a hot item for makers of kitchen equipment, business machines, architectural products and other producers who rely on good appearance for sales appeal. An increasingly popular way to produce such a finish is by using abrasive-impregnated nylon. Photos on pages 78-79 show typical instances where the fabric-abrasive product is doing a job.

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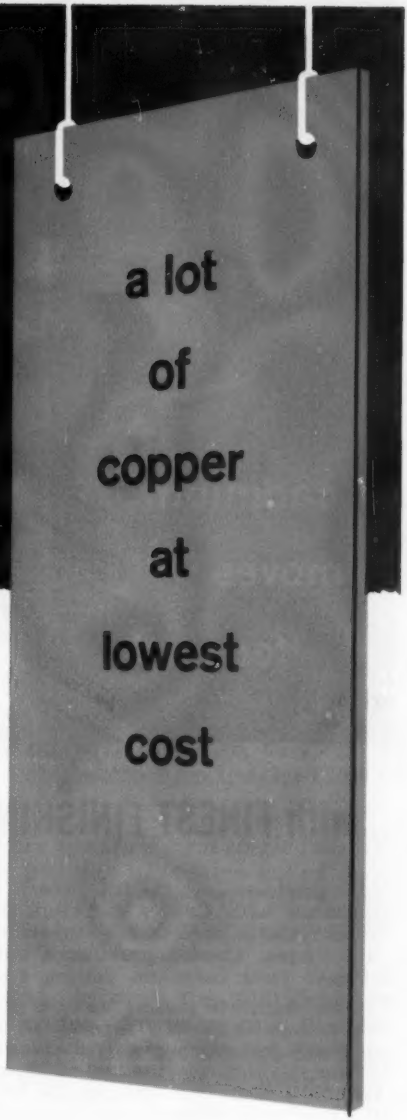

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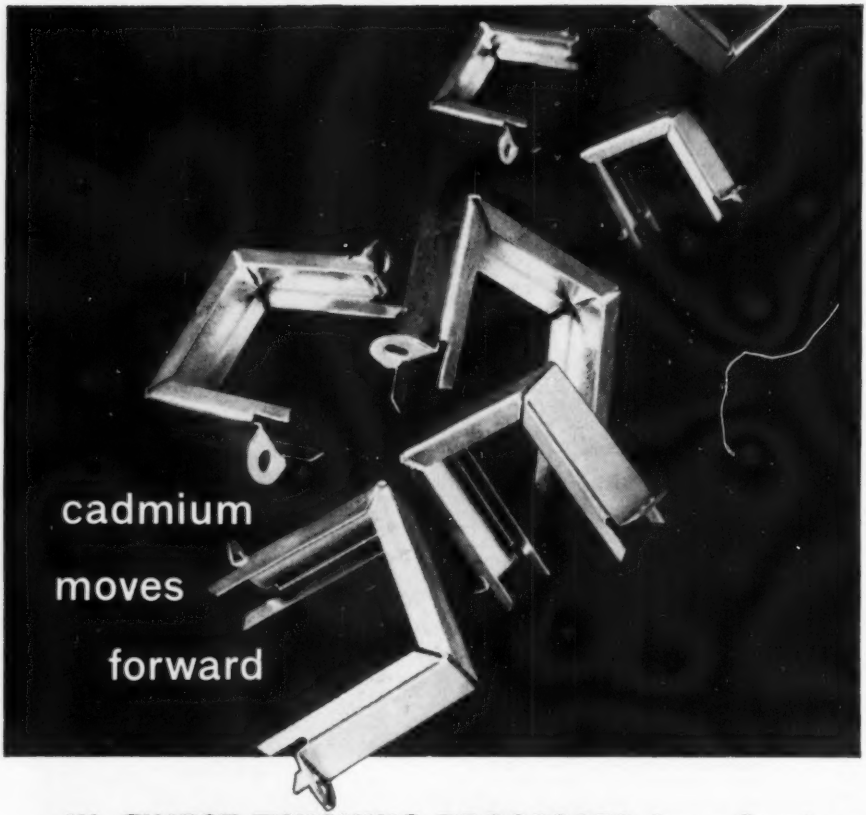

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guest editorial

Zinc Chromate Primers: A Snarl in Terminology

It is a constant source of amazement to us that so many finishers do not know the differences between the tetroxy zinc chromate polyvinyl-butyral wash primer (etching primer) and the more conventional "oil-base" zinc chromate primer.

The latter does not even contain the same type of zinc chromate pigment as that used in a wash primer. It can be formulated with almost any desired vehicle—from raw linseed oil to catalyst-cured polymers—depending upon the application and desired properties.

The "wash" or "etching" primer provides some corrosion resistance, but it is used primarily as an adhesion promoter, or bonding coat. Most manufacturers of wash primers specify a maximum film thickness of 0.5 mil and a preferred thickness of about 0.3 mil.

When applied in greater thicknesses, or in multiple coats, wash primers lose their effectiveness as adhesion promoters. In any case, they do not afford the degree of corrosion resistance obtainable from heavier films of regular zinc chromate primer.

Quite frequently both types of primer are specified for a single finishing system. Our recommended practice for painting aluminum-hulled boats for salt-water service calls for one coat of wash primer, 0.5 mil or less, followed by two or three coats of vinyl-resin zinc chromate anti-corrosive primer, then the desired anti-fouling coat(s).

Finishers should be able to differentiate between the zinc chromate wash primer which is primarily an adhesion promoter, and the zinc chromate primer that is applied to increase corrosion resistance. Both are important and no finisher should be in doubt about the distinction.

Harold A. Page

Research Chemist
Finishing and Electrochemical Applications Branch
Kaiser Aluminum & Chemical Corporation

EXCLUSIVE PF FEATURE

VAPOR DEGREASING:

By R. C. **FULLERTON**
University of Pittsburgh

Richard C. Fullerton is doing graduate study work at the University of Pittsburgh under a scholarship program established by Diamond Alkali Co. and Phillips Manufacturing Co.

An examination of vapor degreasing, its advantages and limitations; two commonly used solvents, their similarities and differences . . .

Solvent degreasing is an important method of cleaning metal. It isn't the only method, of course, and depending upon the type of soil being removed and production-line conditions, it may not be the best method. Aqueous alkaline or acidic cleaners or emulsion cleaners may be a better bet. Or aqueous cleaners may be used in a cycle that also includes solvent vapor degreasing.

Solvent-vapor degreasing has certain features not possessed by other methods of cleaning metal, however:

- Contaminants are removed rapidly, usually in a minute or less.
- Parts emerge dry.
- The vapor penetrates blind holes, cavities and other inaccessible places, removing oil and grease as well as chips and other insolubles.
- Solvent cost is practically independent of the amount of soil removed, since the solvent is continually redistilled and used again.
- A vapor degreaser occupies comparatively little space.

The two solvents most used for vapor degreasing today are trichlorethylene and perchlorethylene —two chlorinated solvents that have a lot in common. What are the characteristics of these two solvents? How much of each is being used for cleaning metal? What developments have increased their use for degreasing? How can we choose the better solvent for a given task?

A Study of "Tri" and "Per"

Trichlorethylene

Trichlorethylene—or "tri" as it's commonly referred to — was first used in Germany around the turn of the century as a replacement for the "soda-kettle" method of degreasing.

While the new solvent did a good job of cleaning, there were serious disadvantages. Crude production and handling methods made "tri" expensive and hazardous to use. Little was known about stabilization and as the solvent became more acidic during use, it often destroyed equipment and etched parts being processed. Equipment was not constructed scientifically and rules for using degreasers so as to prevent safety hazards and conserve solvent hadn't been written yet.

Trichlorethylene was not produced in the United States until 1925, when Du Pont put it's first unit into production. The U. S. built its first vapor degreasers in 1935.

Research on stabilizers began in 1926 and the developments that resulted did much to increase acceptance of "tri." By 1935 U. S. production had mounted to 35 million pounds annually.

The better machines that followed the first degreasers, plus the great strides made in developing stabilizers, have resulted in acceptance of vapor degreasing as a safe and economical method of cleaning.

Total production capacity for "tri" in the United States is now over 500 million pounds annually, with Du Pont having about half of this capacity.

We import over 12 per cent of our trichlorethylene, primarily from Italy and the United Kingdom. Germany, Sweden and France also produce "tri," showing that its use is common in Europe.

The price of "tri" has ranged from 10 cents a pound in 1950 to approximately 14 cents a pound in 1961.

Perchlorethylene

Perchlorethylene is almost as old as "tri," having first been produced by the Germans in 1910. Dow Chemical Co. was the first major U. S. producer. Production has risen from one million pounds in 1935 to 200 million pounds annually in recent years. "Per" is now produced by Diamond Alkali Company, Dow Chemical Company, Columbia Southern Chemical Co., Stauffer Chemical Co. and E. I. du Pont de Nemours & Co., Inc.

(continued)

"The amount of heat required to vaporize the solvent may determine which solvent should be used."

Present capacity for producing "per" is 275 million pounds per year. Imports account for 15 to 17 million pounds, or approximately 8.5 per cent of total consumption in the United States.

Perchlorethylene is not nearly as popular for degreasing as trichlorethylene. Three fourths of the "per" used in this country is consumed in dry cleaning clothes.

Until recently price was a deterrent to anyone considering use of perchlorethylene over trichlorethylene. But recent price adjustments have practically eliminated this difference and the choice is now a matter of which material will be better for a given application.

Trichlorethylene Versus Perchlorethylene

"Tri" and "per" are similar in many respects. Both have properties of a good cleaning solvent:

- Ability to dissolve a wide range of soils which cling to metal, such as greases, waxes, resins, tars, gums and fats.
- Inertness to metal; the ability to clean without attacking the metal.
- Nonflammability—neither will burn or explode at reasonable temperatures.
- Low toxicity—minimum danger of harming personnel when in contact with clothing or skin, or when fumes are inhaled.
- Low cost—must be possible to recover a high percentage of the initial charge by distillation, so that principal cost is the initial cost of the solvent.
- Low latent heat value so that amount of heat required for vaporizing is minimized.
- High-density vapor—which reduces solvent losses, makes control of vapor level easier, exposes as much vapor as possible to the work area.
- Reasonable boiling point—low enough to facilitate separation of solvent from soil, high enough to ensure liquefaction of the vapor without refrigeration.
- Chemical stability—the ability to resist chemical change even under adverse conditions of use.
- Ability to support cavitation in ultrasonic degreasers.

Trichlorethylene and perchlorethylene both qualify as excellent degreasing solvents by these standards. But there are important differences that determine which solvent is better for a given application.

Some soils are soluble in perchlorethylene but not in trichlorethylene. If such soils are present, obviously perchlorethylene should be used.

While certain types of stabilized "tri" are said to be safe for use in degreasing aluminum, there have been cases of explosions reportedly caused by reaction of aluminum chips with trichlorethylene and subsequent overheating. Thus perchlorethylene is often recommended for degreasing aluminum.

The amount of heat required to vaporize the solvent may determine which solvent should be used. Trichlorethylene requires 30 per cent less heat to convert it to vapor, thus it can be used in plants that

"Both 'tri' and 'per' require additives called stabilizers if they are to remain chemically stable."

have only low-pressure steam (10-15 p.s.i.). Perchlorethylene, however, requires a steam source of 45-60 p.s.i., thus it's automatically eliminated from plants that must use an existing low-pressure steam source for economic reasons.

The higher boiling point of perchlorethylene also causes metal parts to be very hot when emerging from the degreaser. This could be a disadvantage if the part has to be handled soon after it emerges.

On the other hand, the higher boiling point of perchlorethylene can be an advantage when cleaning light-gauge steel or aluminum parts. Perchlorethylene permits more time for removing oils and greases, since it takes a longer time for the part to reach the higher temperature that is the boiling point of perchlorethylene. When this point is reached—when the temperature of the part is the same as the temperature of the vapor, condensation ceases. On a heavily soiled part, this difference in solvents may be important, especially if the part is light gauge and rises rapidly to vapor temperature.

Another significant difference between "tri" and "per" is that water is not removed when using trichlorethylene without special additives. Cationic surface active agents must be added to cause formation of a low-boiling-point mixture from which the water is removed during distillation if water removal is necessary. There is a specific grade of "tri" called Trisec that has this property. Perchlorethylene, on the other hand, requires no additives for removal of water.

Stabilizers

Both "tri" and "per" require additives called stabilizers if they are to remain chemically stable during repeated usage. The stabilizers must be volatile; they must distribute themselves in both the liquid and vapor phases; they must be recoverable along with the vapor. Modern stabilizers deactivate acid contaminants without themselves undergoing change. They remain in the solvent when it's distilled for re-use.

Acidity

Standard practice for testing acidity of degreasing solvents is to back titrate with a standard solution of alkali and express results as a percentage.

Oil Content

Oil content of a degreasing solvent is also important. It should not be allowed to go over 30 per cent. Determine this by checking specific gravity (maximum of 1.29 for "tri," 1.39 for "per") or by watching boiling point (195 deg. F. maximum for "tri"). Allowing oil content to go over this percentage will result in excessive heat and solvent breakdown.

Alkalinity and Neutrality

"Tri" and "per" are available in "neutral" and "alkaline" grades—terms that are not used strictly in accordance with chemical terminology. The importance of these classifications is that alkaline grades react with acid contaminants while

(continued on page 50)

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neutral grades accept the acid but do not react.

Limitations of Degreasing

Like many industrial processes, solvent degreasing has limitations:

1. Degreasing is not a good way to remove hard, caked-on soils. Soaking in alkaline or acidic aqueous-type cleaners does a better job.
2. Certain soils react with chlorinated solvents. Such soils must be removed from a part before it enters a degreaser.
3. Degreasing solvents do such a good job of removing oil that parts rust rapidly when they leave the degreaser. If they are to be stored after degreasing and before finishing, they must be protected by oils or other temporary protective coatings.

Summary

Both trichlorethylene and perchlorethylene were first produced in the early 1900's. The development of reliable stabilizers and good equipment and techniques for safe and efficient handling of these solvents has led to their widespread use in degreasing metal. Both solvents have the basic attributes of good degreasing solvents, but there are important differences that should be studied in selecting a solvent for a particular application. Acidity and oil content should be controlled during use of these solvents. Selection of the proper grade of neutral or alkaline solvent is also important in getting best results from a degreasing operation. There are some tasks that vapor degreasing will not do as well as aqueous cleaners and vice versa.

Additional copies *of this article are available as long as the supply lasts. Write PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.*

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A survey of the many treatments and coatings that color aluminum building materials and add to their durability . . .

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PART: Automatic Transmission Valve
MATERIAL: SAE 1112 Steel
OPERATION: Fine finish and put 0.0015″ to 0.003″ radius on edges.
PRODUCTION: 3,600 parts per hour, per processing tub.
FINISHING COST: Down 30%.

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How Shwayder Brothers Finishes Magnesium Extrusions

Bright-pickling closures for luggage . . .

By JAMES H. JENKINS
Chemical Engineer
Shwayder Brothers, Inc.
Denver, Colorado

The world's largest bright-pickle line for magnesium finishes extrusions used as tongue-and-groove closures on luggage.

This conveyorized bright-pickle line at Shwayder Brothers, Denver, finishes the extrusions in a nine-step dip operation based on 12-

(continued)

Fig. 1—Loader attaches racked extrusions to conveyor arms of automatic processing machine.

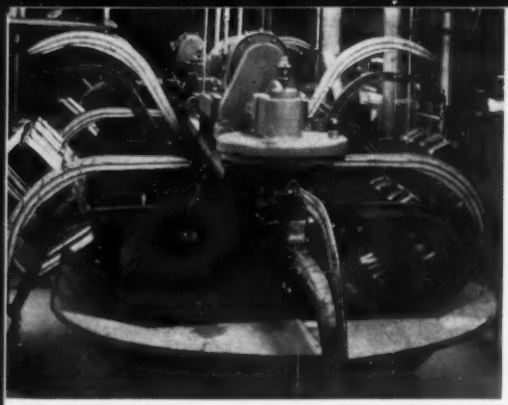


Fig. 2—Overall look at conveyorized line which finishes magnesium luggage closures.

second immersions. Purposes of the treatment are to brighten the extrusions and improve corrosion resistance.

Formed extrusions are mounted on stainless steel and nylon racks, each of which take eight closures for full-size luggage, or 16 of the extrusions used for a small train case.

Racked extrusions proceed automatically through the following solutions:

1. Alkaline cleaner, 2 minutes.
2. Cold-water rinse, 12 seconds.
3. Seven per cent nitric-acid pre-brightener, 36 seconds.
4. Cold-water rinse, 12 seconds.
5. Ferric-nitrate bright-pickle brightener, 2 minutes.
6. Cold-water rinse, 12 seconds.
7. Sodium-carbonate bleach, 48 seconds.
8. Cold-water rinse, 12 seconds.
9. Hot water rinse, 12 seconds.

Total treatment time is 6 minutes, 24 seconds.

The nitric-acid pre-brightener removes from 0.0005 to 0.001 inch of metal per surface and functions chiefly as a buffing agent. It also prolongs the life of the ferric-nitrate bath and reduces total processing time.

The ferric-nitrate bright-pickle solution (Dow 21, a treatment de-

(continued)

Fig. 3—After bright pickling operation, this Ransburg No. 2 Process electrostatic disc sprays the extrusions with clear lacquer.

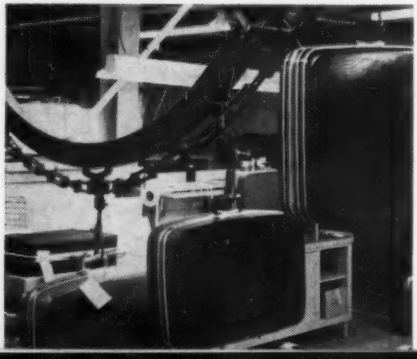
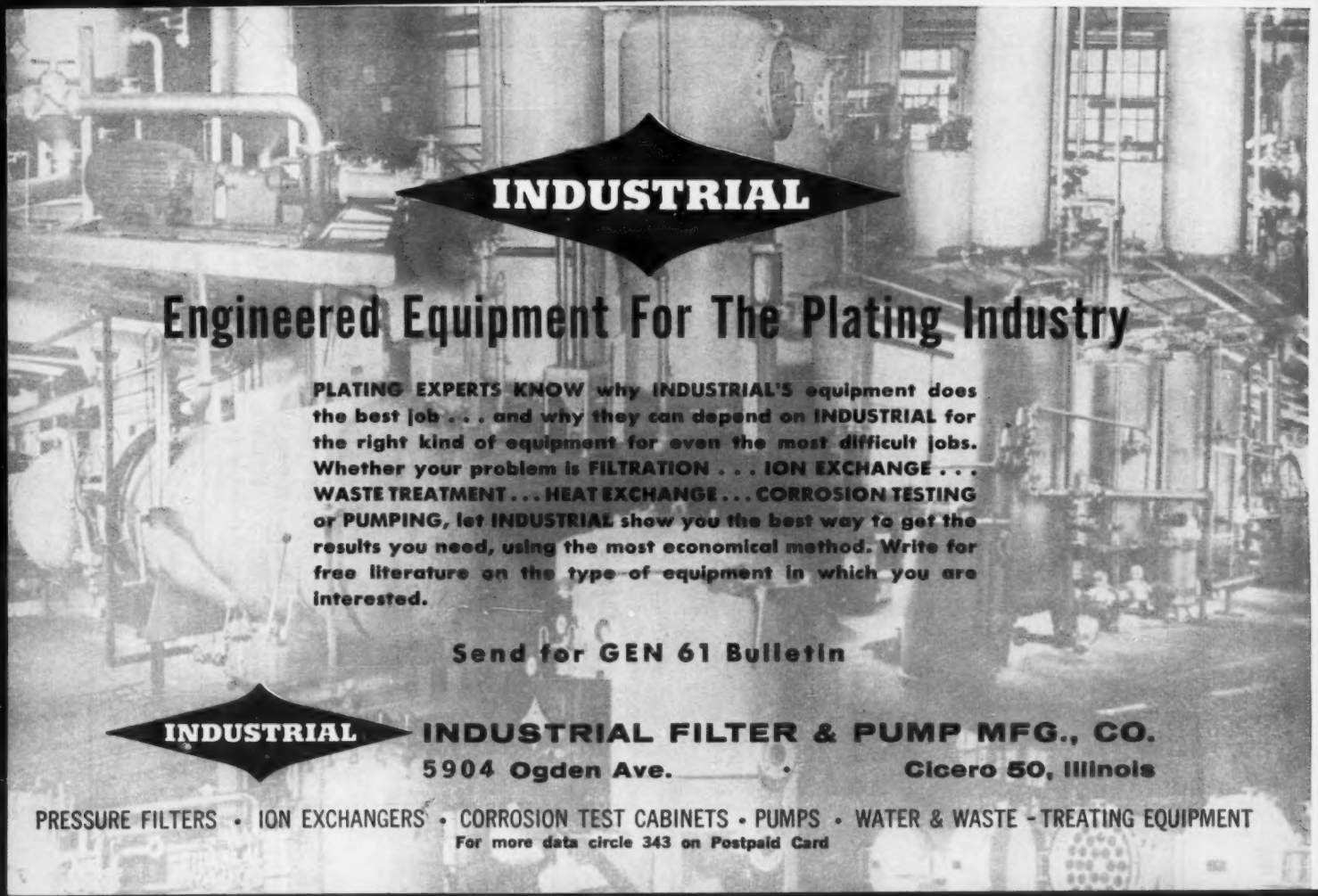


Fig. 4—Bright-pickled magnesium extrusions are styling feature of Shwayder Brothers luggage. (Photos courtesy Dow Metal Products Co., and Shwayder Brothers, Incorporated.)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veloped by The Dow Metal Products Company, Division of The Dow Chemical Company, Midland, Michigan, consists of the following:

Chromic acid—24 oz.
Ferric nitrate—5 1/3 oz.
Potassium fluoride—0.35 oz.
Water to make 1 gallon.

About 0.0003 inch per surface of metal is removed by this solution.

Purpose of the sodium-carbonate bleach is to remove any stains not removed by the cold-water rinse following the ferric-nitrate bath.

At the end of the conveyorized line, an operator transfers the racked extrusions to another conveyor, which takes them through a drying oven. Next, the parts are electrostatically sprayed with a clear baking enamel. After 15 minutes baking, the extrusions go to the luggage assembly lines.

Protective Coatings for Refractory Metals. By C. G. Bergeron and others, Department of Ceramic Engineering, University of Illinois, for Wright Air Development Division, U.S. Air Force. 45 pages. Order PB 171 193 from OTS, U.S. Department of Commerce, Washington 25, D. C. Price, $1.50.

Various ceramic coating systems for tungsten metal were developed and evaluated. These included silicide coatings, ceramic crystals in a glass matrix, zirconia-clad coatings, vapor-deposited SiO, and recrystallizing glasses. The most effective coating, which was effective for tungsten at temperatures of 3000 deg. F., or higher, was a coating consisting of 35 per cent glass and 65 per cent zircon. Tungsten wire specimens so coated were protected for ten hours at 3000 deg. F.

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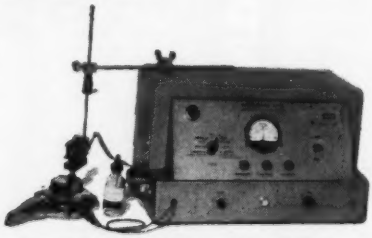

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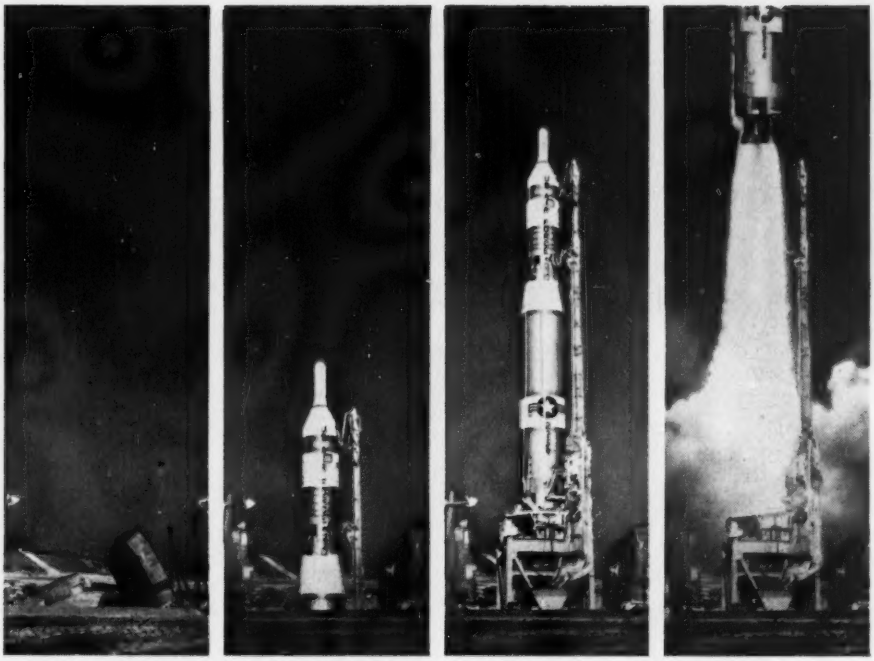

Squadrons of Air Force Intercontinental Ballistic Missiles nest underground in strategically placed concrete silos. As 200-ton doors swing open, the missile rises to lift-off position, is ready in seconds for launching.

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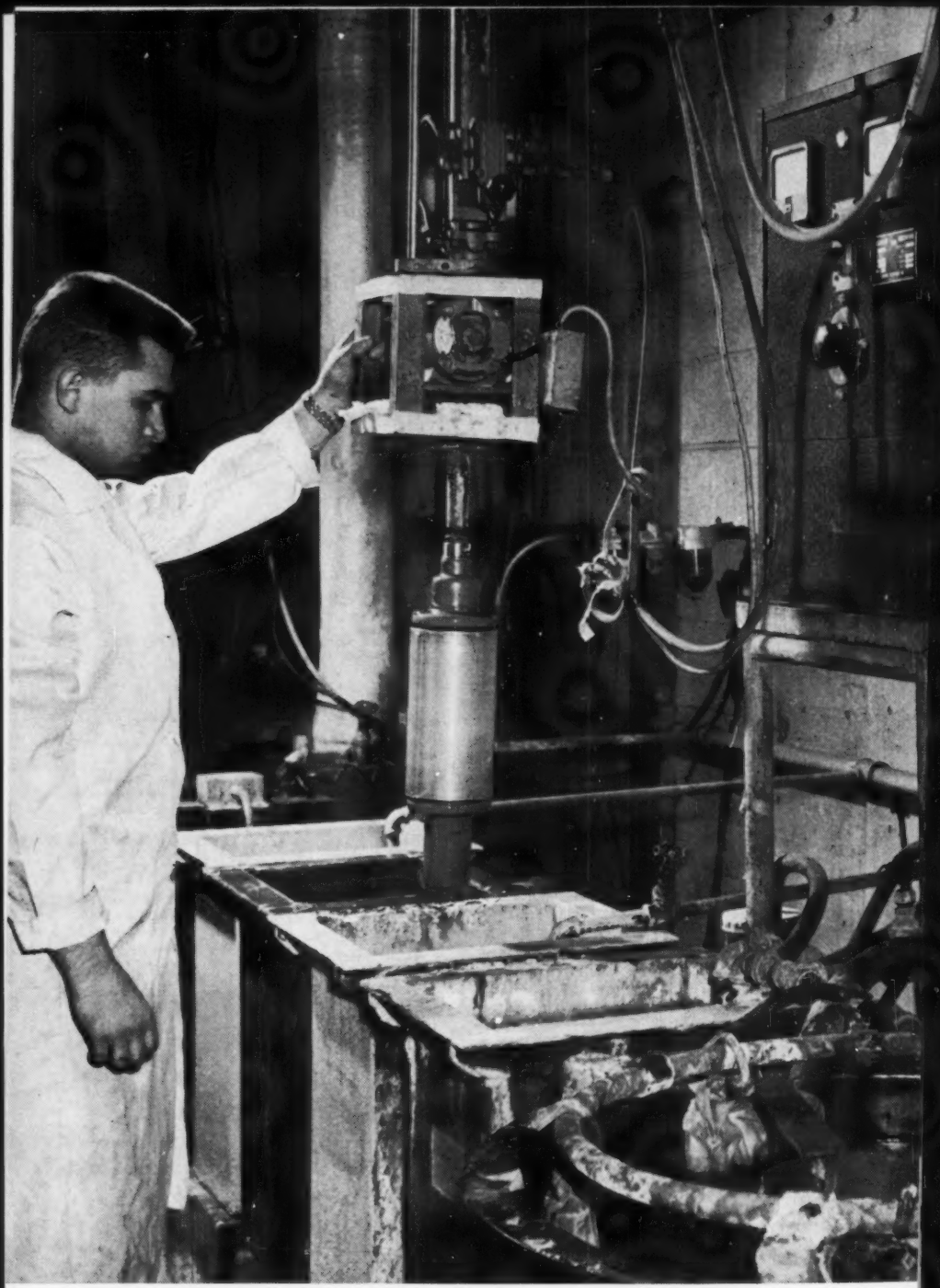

Finishing Process Helps Computer "Remember"

Zincate process bonds copper plate to aluminum memory drum . . .

A process for plating copper over aluminum has simplified a key step in the manufacture of the Univac Computer. Known as the Alumon process, the electroplating method was developed by Enthone, Inc, a wholly owned subsidiary of American Smelting and Refining Company (Asarco). It's a zincate process which permits adherent deposition of copper over aluminum.

Use of the process has enabled Remington Rand Division of Sperry Rand Corporation, manufacturer of the Univac, to use aluminum in place of heavier materials for the critical memory drum. The memory drum stores the basic information required in succeeding stages of a calculation.

The memory drum spins at high speeds which generate substantial centrifugal forces. Thus the use of aluminum offered an obvious advantage. But because the centrifugal forces also

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Fig. 1—Memory drum emerges from the zincate bath after a two-minute immersion.

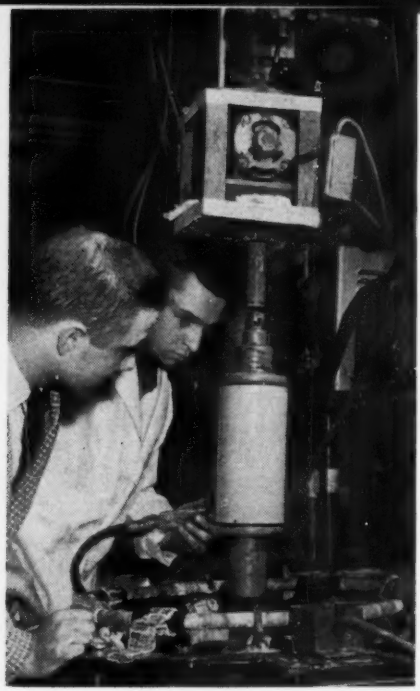

Fig. 2—Supervisor checks on copper plating of the aluminum Univac memory drum.

Fig. 3—Inspecting the finish on the copper-plated drum. At this stage, the precision-made drum is worth $500.00. (Photographs courtesy Enthone, Inc., subsidiary of American Smelting and Refining Co., and Remington Rand Division of Sperry-Rand Corp.)

tend to pull away surface coatings, a firm bond is absolutely necessary for coatings applied.

Extensive tests by Remington Rand demonstrated the effectiveness of the Alumon process in producing a bond that would hold under the forces generated by the fast spinning. The process is now a key step in the manufacture of the computer.

Steps in producing the memory drum are carried out to extremely close tolerances. One indication of this is the factory value of the finished drum, plated and ready for assembly—more than $500.00.

The basis material is extruded 6061 T-6 aluminum bar stock which has been stress relieved, cut into 9-inch lengths, turned to 4.980 inches in diameter. Specifications call for a 10-microinch surface smoothness.

The drums are first cleaned in an etching solution and then the slowly rotating drum is dipped into a solution of 75 per cent nitric acid plus Enthone Actane activator. Next step is the Alumon double-zincate process which activates the aluminum alloy surface and, at the same time, deposits a film of zinc. This immersion zinc plate can then be plated over by conventional electrodeposition techniques.

Zincating is performed by revolving the drum in the zincate solution for two minutes. It is then returned to the acid activator solution and the zincate film stripped, after which it is returned to the Alumon bath for 10-20 seconds to deposit a very fine film of zincate. Warm rinses are used between the active tanks.

(continued)

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After the zincate film has been applied, the drum goes into a copper cyanide strike which leaves a 0.0001 inch film of copper. It is then plated electrolytically in a standard acid copper sulfate bath to 0.040 inch radius. When dry, the drum is ground down to exact size, smoothed to 5-10 microinches and finally lapped to 1 microinch finish.

The final nickel-cobalt magnetic memory film is then electrodeposited, and, after balancing and inspection, the drum is ready for assembly into the Univac Computer. After basic data processing information is fed onto the drum, the computer is ready for use with all kinds of tape and punched-card machines.

★ ★ ★

Airless Spray Pump Has Airplane-Type Cylinder

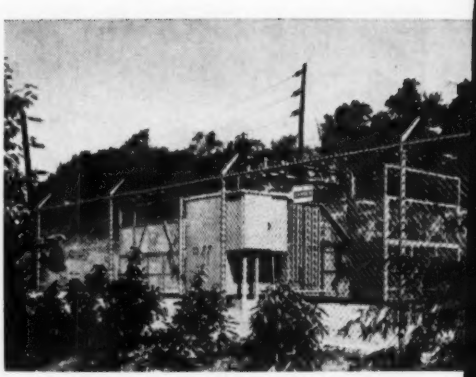
An aluminum cylinder replaces the cast iron cylinder formerly used in Nordson pumps for airless spray painting. The new aluminum cylinder is subjected to a hard-coat anodizing treatment to produce a hard, wearing surface.

Advantages of the airplane-type aluminum cylinder include weight reduction, improved heat dispersion and lubricant retention, better wear.

★ ★ ★

Conversion Coating Improves Aluminum Fencing

Those green fences you're seeing around electrical substations aren't painted. They've been chemically treated with a product that converts the surface of aluminum to a green matte finish. This protective coating is an integral part of the metal.



Outdoor substation fenced with aluminum chain-link fencing that has been conversion coated. Green color blends with foliage to improve appearance. (Photograph courtesy Amchem Products, Inc., Ambler, Pa.)

One of the companies making the conversion-coated aluminum fencing is Chain Link Fence Company of Pennsylvania. This firm treats 6061 aluminum alloy fence with Alodine, an amorphous phosphate-chromate coating made by Amchem Products, Inc., Ambler, Pa.

Alodine reacts with aluminum to form a light-green-colored coating on the surface. The treatment is applied after the fence "cloth" has been woven. It greatly improves corrosion resistance, produces a hard, thin, adherent coating.

The coating's matte surface reduces glare—up to 30 per cent less than untreated aluminum fencing.

The phosphate-chromate coating resists flaking, chipping and peeling, has excellent thermal-shock properties, minimizes and localizes corrosion caused by "through-to-the-metal" damage. Power companies have found that this fencing requires no paint, even in corrosive atmospheres.

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Why Ford Chose

Galvanized Steel To Improve Corrosion Resistance

An extensive testing program evaluated many methods and materials proposed to reduce body corrosion on cars of unitized construction . . .

By JOHN C. WIDMAN
Executive Engineer
Ford Motor Co.

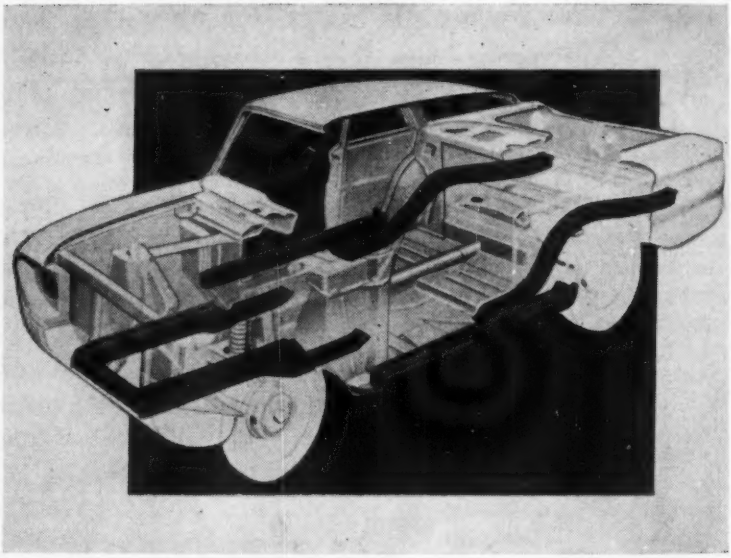

Fig. 1—Ford's extensive evaluation program resulted in usage of galvanized steel in the darkened areas on the Falcon shown in phantom view.

In October 1959 the Ford Falcon became the first car to use substantial amounts of galvanized steel for construction purposes (Fig. 1). Since that time Ford has increased usage of galvanized steel in all of its cars and in some of its trucks.

We began using galvanized steel after an extensive testing program to find methods of improving corrosion resistance. Our primary reasons for increased interest in corrosion protection are as follows:

1. Unitized designs make it necessary to prevent corrosion in order to preserve *structural integrity* as well as exterior appearance.
2. The lighter-colored paints now popular not only attract attention to rust streaks, but have less inherent protective qualities than darker colors.
3. Increased use of deicing chemicals on streets accelerates corrosion.

The decision to use galvanized steel to achieve the improvements in corrosion protection was the result of a program in which we evaluated many methods and materials proposed for improving resistance to corrosion.

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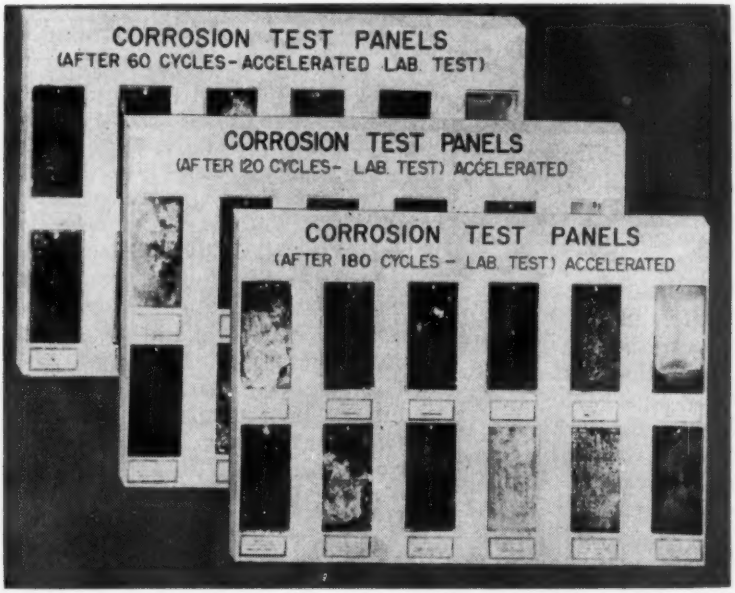
CORROSION TEST PANELS
(AFTER 60 CYCLES - ACCELERATED LAB. TEST)
CORROSION TEST PANELS
(AFTER 120 CYCLES - LAB. TEST) ACCELERATED
CORROSION TEST PANELS
(AFTER 180 CYCLES - LAB. TEST) ACCELERATED

Fig. 2—In the first stage of the program many materials and corrosion preventives were tested by comparing test panels in accelerated lab corrosion tests.

TABLE I

Materials Considered To Improve Corrosion Resistance

A. Organic Coatings.
   1. Primers
      a. Solvent-base.
      b. Water-emulsion base.
   2. Metallic-rich paints.
   3. Plastic coatings.
   4. Self-foaming materials.
   5. Greases and waxes.

B. Steel alloys.
   1. Stainless steel.
   2. Special alloys.

C. More unusual methods.

D. Metallic Coatings.
   1. Aluminum clad.
   2. Terne plate.
   3. Tin plate.
   4. Cadmium plate.
   5. Zinc coated.
      a. Electrogalvanized.
      b. Hot dipped.

The program began in 1957, when production engineering of the Falcon was started. Corrosion protection of the critical structural members of the proposed unitized construction was an obvious necessity. We could no longer depend on a heavy-gauge chassis frame to carry the chassis components and attachments.

Consideration of using painting methods then employed to increase corrosion protection indicated many disadvantages.

Painting of individual parts prior to assembly could not be considered due to lack of space, added cost and welding difficulties.

Painting after assembly would not assure coverage in shielded areas. And inspection of these areas was practically impossible. We had been employing this method on body-frame cars for many years with mediocre success.

Dip painting methods at first glance seemed to be a cure-all. It is quite logical that a part immersed completely in paint should be thoroughly covered. Welding is no problem in this process since the painting is done *after* welding. Unfortunately, the results of tests using this method have been disappointing.

Fig. 3—Tests cells made of materials being tested were suspended beneath vehicles which were operated through a winter season.

In addition, the installation of dip tanks, wash-off areas, draining areas, and dry-off areas is expensive and many of our assembly plants do not have the space necessary for this equipment.

Perhaps the biggest obstacle to effective protection from corrosion by this method is a condition known as "refluxing." This reaction occurs in the enclosed areas of a boxed member when evaporating solvents from paints applied condense on a relatively cool surface—usually a more exposed surface—and then these droplets run down the surface, dissolving the paint film. Upon

(continued)

Fig. 4—Promising materials were fabricated into rocker panels which were tested on cars in actual operation. This Falcon test car is traveling Ford's heavily salted durability route on the Michigan Proving Grounds.

"We embarked on an intensive program of investigating all known methods of corrosion protection . . ."

striking a warmer surface, the solvents revolatilize and the cycle continues until the vapors are dispersed. The results in some cases are worse than if no painting had been attempted, since even the protective mill oil has been removed.

We embarked on an intensive program of investigating all known methods of corrosion protection which consisted of at least careful consideration of the possible results and problems involved in each method.

A preliminary investigation of the materials in Table I was made in the standard salt-spray cabinet on 4-by-8-inch coupons. Corrosion resistance was compared to plain low-carbon steel panels and standard painted panels. Only those items which displayed serious defects were eliminated at this stage of the testing. (Fig. 2).

Test cells or boxes approximately 4 by 4 by 8 inches in size were then made up with various types of joints and ventilation apertures. A total of 120 of these units were suspended under vehicles which were operated through the winter (Fig. 3).

After this stage of testing, the most promising materials were fabricated into car parts (rocker panels) and tested on vehicles. This consisted of operation through a five per cent salt bath at our Michigan Proving Ground and over the rough durability route, as much in the manner of customer operation as was possible (Fig. 4).

The net results of all of our tests began to take a consistent shape. We had found several materials that looked promising from a corrosion resistance standpoint. It was then necessary to rate the materials on the following basis:

1. Formability.
2. Weldability.
3. Painting.
4. Method employed.
5. Stock (and scrap) handling problems, if any.
6. Cost.

Formability tests were run as Olsen Cup tests and also by actually forming parts in production dies.

Welding tests consisted of spot welding strips of the material together at production rates until the spot weld size was reduced to an unacceptable minimum. The feasibility of spot welding was our chief consideration, since this is the prime method of joining automotive body assemblies. While gas and arc welding are used, these are of lesser importance.

Tests for painted parts consisted of checks for adhesion, appearance, water-immersion resistance and salt-spray resistance.

The "Method Employed" category indicates what special provisions might be necessary in applying, inspection and so on.

Evaluating the various materials under consideration, we came to the following conclusions (Referring to Table I):

A-1. Solvent-type and emulsion primers protect well when properly applied over clean surfaces, but our experience indicates that this is

difficult to achieve in the oily interiors of boxed members. Hand spraying is inappropriate for the inaccessible areas and dip painting caused "refluxing" in enclosed sections.

A-2. The metallic-rich primers adequately protect but again we encounter the application and cleaning problems.

We investigated both zinc-rich primers and aluminum-filled primers. Both materials provide good corrosion protection. But once again, the problems of properly prepared surfaces, complicated structures and the inability to adequately inspect if applied after assembly reduce their appeal.

The zinc-rich primers are not difficult to weld—provided the electrodes are not in contact with the primed surface. Far more difficult to weld are the aluminum-filled primers.

A-3. Some of the plastic coatings provide excellent corrosion protection, but because of their high dielectric strength, they cannot be applied prior to welding. Application after welding presents the usual problems.

A-4. Several trials were made with various self-foaming plastics, with the hope that a filled cavity would prevent moisture entry. It was also hoped that the plastic would coat the surfaces and increase the section modulus. Some benefits were noted but erratic foaming performance and costly materials eliminated this method from further consideration.

A-5. Greases, waxes and similar materials provide some protection, but again it is questionable if the cost and uncertainty of application is warranted.

It appears that any coating which is applied prior to forming a part has disadvantages. Subsequent operations may remove or damage the coating, resulting in reduced corrosion protection. The coatings tend to clog dies and fixtures, and in the case of spot welding, reduce the effectiveness and number of welds possible before cleaning is necessary. This is time consuming and costly.

If greases and waxes are applied after forming and prior to assembly, large areas for application and curing must be available.

If these materials are applied after assembly, inadequate protection is the result of inability to cover completely the complex structure being treated.

B-1. Stainless steel resists corrosion but imposes restrictions in forming and is costly.

B-2. Other alloys such as copper-bearing steels and NAX did not demonstrate the necessary qualities in corrosion resistance and formability to warrant serious consideration for body sheet metal parts.

C. Some of the more unusual methods attempted were use of vapor-phase inhibitors, irradiated steels and forced ventilation.

It is probable that each of these in certain circumstances would provide some benefit, but in our tests they showed little advantage.

The vapor-phase inhibitors are effective in an air-tight enclosure, a condition not likely to be found in the structural parts of an auto-

(continued)

mobile body. Preliminary tests were discouraging.

The use of irradiated steels showed no benefits; in fact there were indications that this treatment tended to increase the rate of corrosion.

Some authorities have advocated the use of well-drained, well-ventilated sections to reduce rate of corrosion. Many such areas on automobiles do not rust rapidly. However, our initial efforts in this direction were not fruitful.

We forced relatively warm engine-compartment air through one rocker panel section and put it on our salt spray durability route for over a year. Periodic examination throughout this time indicated no advantage over the standard construction on the opposite side of the car. There are probably numerous ways to approach this problem but increasing air flow through a boxed section does not appear to have the advantages claimed.

D. The metallic coatings appeared promising, and a considerable amount of work was performed in testing them in our program.

D-1. Aluminum-clad steel, while giving excellent corrosion protection, proved too difficult to weld. It was abandoned for this reason.

D-2. Terne plate was of considerable interest, as it had been used for many years, mainly in fuel tanks, and was a known quantity in our shop besides doing an adequate job of protecting.

D-3-4. Tin and cadmium plate perform well but facilities for producing wide sheet are not available and the cost is higher than for zinc.

D-5. This brings us to the consideration of zinc. Electro-galvanized steel with adequate coating thickness is more expensive than the hot-dipped galvanized sheet and was thus eliminated for large-quantity usage.

Hot dipped galvanized steel showed many desirable characteristics: it is readily available in coil or sheet; its price is reasonable and our tests indicate that it has excellent corrosion resistance compared to other materials tested.

The zinc coating causes little difficulty in forming. Early fears that scoring and flaking would load up the dies proved groundless. Our stamping people actually endorsed the use of galvanized steel, claiming that the coating has some lubricating properties and is, in fact, beneficial to press operations.

Wherever stamping difficulty did occur, the defect was always shown to be in the base sheet and not in the coating. The galvanizing operations may interfere with the base-sheet properties, but the zinc coating does not interfere, per se.

In the welding trials, first attempts were discouraging. Build-up of a scale-like substance on the welding tips caused early deterioration of the weld quality and required frequent interruptions to clean tips. This practice would increase costs and require additional plant space to maintain production schedules.

The first real breakthrough in getting around this problem came when the Weirton Steel Company

(Division of National Steel) offered samples with a reduced coating thickness on one side.

By using the thin side for contact with the welding tip, results were much improved. Using the welding standards then in use in production, a substantial increase in the number of good-quality welds were obtained. The welding point "pickup" using the differentially coated galvanized, as it came to be called, was a lot less than with a fully coated sheet.

In addition to the contribution by Weirton Steel of differentially coated galvanized material, the research work done by the Ford Motor Company Welding Development Department in improving welding certainly deserves commendation.

Differentially coated galvanized steel plus proper welding techniques enabled us to reach the desired goal of more than two thousand spot welds between electrode dressings. It appeared that galvanized steel could now be put into production.

The next problem concerned paint. Applied by conventional methods, paint did not adhere well and resistance to blistering was not good on the galvanized steel.

Our usual method of testing a painted sample is to send a coupon through the phosphatizing system, prime and paint it. The prime coat is lightly water sanded. The panel is then scribed and subjected to 250 hours of water immersion. A duplicate panel is subjected to 250 hours of salt spray. Mandrel-bend tests and scratch tests determine whether adhesion is up to par (Fig. 5).

The adhesion and water-immersion test results were not adequate and again extensive research had to be undertaken to improve these qualities.

Our paint people found that adhesion could be improved by cleaning the galvanized steel with steel wool or a wire brush and then phos-

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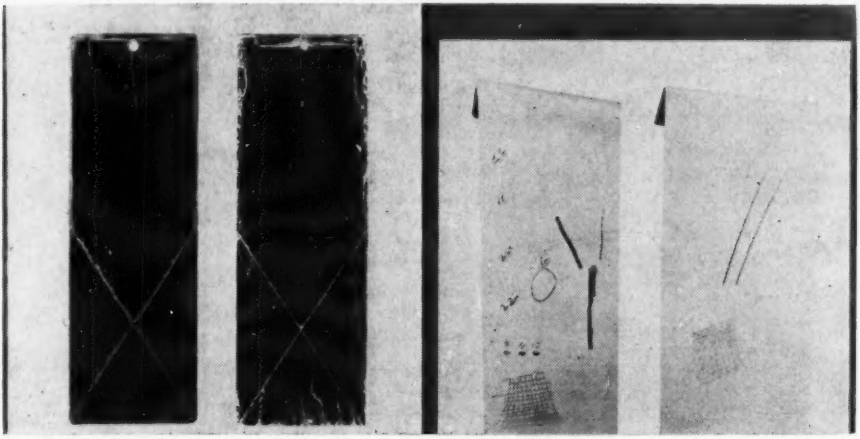

Fig. 5—Adhesion tests for painted panels include water immersion, salt spray, mandrel bend. Scribed panels such as those shown here are used for accelerated tests.

"The blistering problem was corrected by a 'skin pass'."

phatizing and painting in the usual manner.

The blistering problem was corrected by a "skin pass" after it was discovered that the blistering was following the lines of wipe. The skin pass eliminates these flaws.

As a result, we adopted two different standards. One was for galvanized steel used on interior or hidden parts not requiring a finish coat of paint. The other was for parts such as rocker panels where a finish coat of paint of good quality is essential.

With our major problems under reasonable degree of control, differentially coated galvanized steel was introduced into the initial Ford Falcon production in the fall of 1959.

Probably no other innovation in our production has received closer scrutiny and more top-level attention than this in recent years. Despite all of our tests and developments, there were many who felt that this material was too radical and untried for production usage. But the personnel of the Buffalo Stamping Plant were careful and conscientious in their efforts to use it properly. Quality Control constantly tested to assure proper processing. Units were removed from the production line every hour and welds pulled apart. This cooperation resulted in production of a high-quality product.

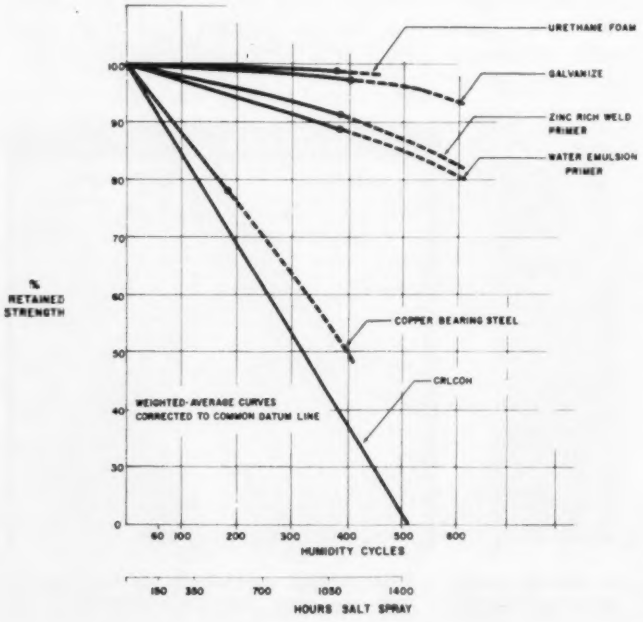

Fig. 6—Chart evaluates various materials for improving corrosion resistance.

Since the introduction of the Falcon, other models have been put into production with extensive amounts of galvanized steel. The Lincoln Continental uses 250 pounds per car, the Econoline uses approximately 92 pounds and the Thunderbird 213 pounds. Our Ford and Mercury models use a lesser amount, since they are not of unitized construction.

We believe that Lincoln Continental and Ford Thunderbird now have the finest corrosion protection in the automotive field (Fig. 7). They use in excess of 200 pounds of galvanized steel and are dip painted to a depth of approximately eighteen inches in a water-emulsion primer. The disadvantage of dip painting, "refluxing," is overcome by using galvanized steel in boxed members and critical areas. Dip painting thoroughly covers all other areas, including those not protected by the galvanized steel.

Since 1959, continued experimentation has effected further improvements. Improvements in the phosphatizing system have eliminated the necessity for wire-brush precleaning. Our first-stage chemical has been altered, resulting in an improved phosphate coating on the entire body, uncoated steel as well as galvanized.

Today, differentially coated galvanized steel has almost given way to equally coated commercial sheet. Continued work on welding techniques has resulted in development of methods which allow us to meet the two-thousand-spot-minimum re-

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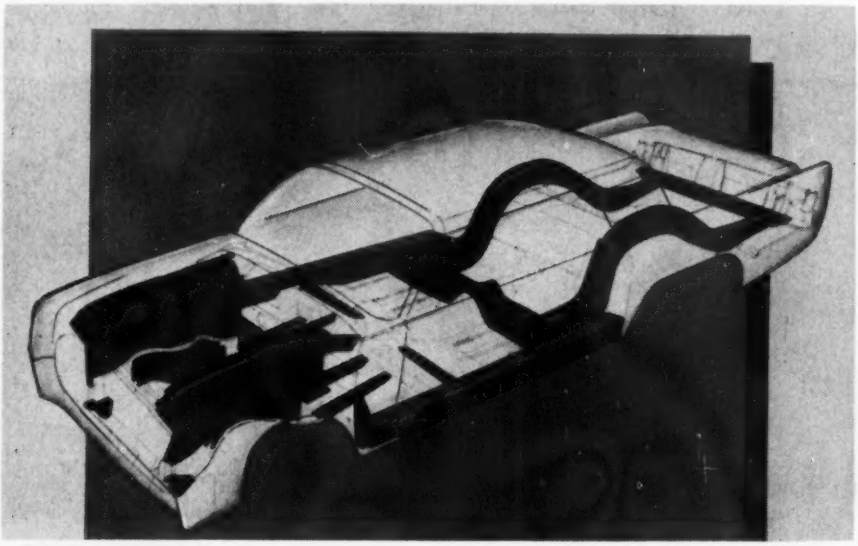

Fig. 7—Thunderbird and Continental use galvanized steel in the areas shown in this phantom drawing as the result of Ford's test program, which evaluated various methods.

"In the summation of all tests, galvanized steel is near the top of the list in corrosion resistance."

quirement when using commercial sheet.

Although differentially coated steel was the "breakthrough" material, we were anxious to change over to equally coated stock. It has these advantages:

1. It offers more protection to the exterior surface, since it has a thicker zinc coating.
2. It is cheaper and no color coding is necessary to indicate orientation in the die. It also eliminates the necessity for right and left hand blanks.
3. It increases the sources where galvanized steel can be procured.

A summary of reasons which led us to use galvanized steel:

1. It has superior corrosion resistance. In the summation of all tests, galvanized steel is near the top of the list in corrosion resistance.
2. It is coated at the mill. This provides close control of quality, both at the mill and in our receiving inspection, giving added insurance of high quality.
3. No additional equipment is necessary. Standard equipment is used throughout our plants with only slight alterations.
4. It can be formed or drawn as easily as uncoated steel. The zinc coating is more adherent than competitive paint coatings.
5. It can be welded. It is probable that welding quality is

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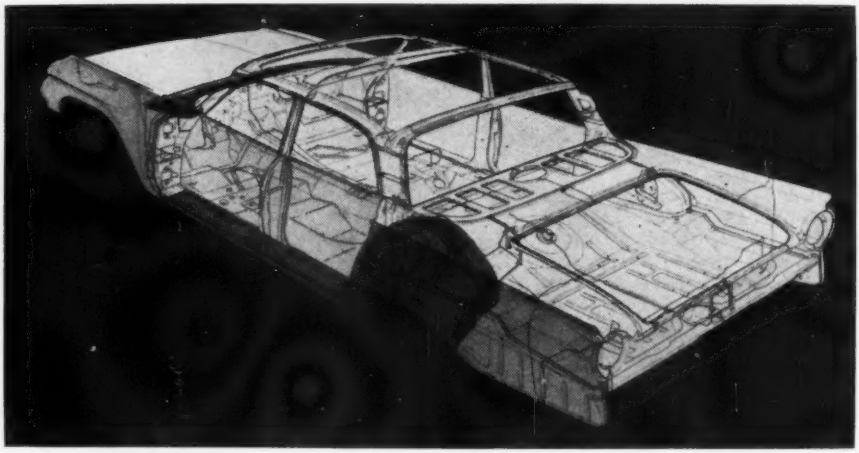
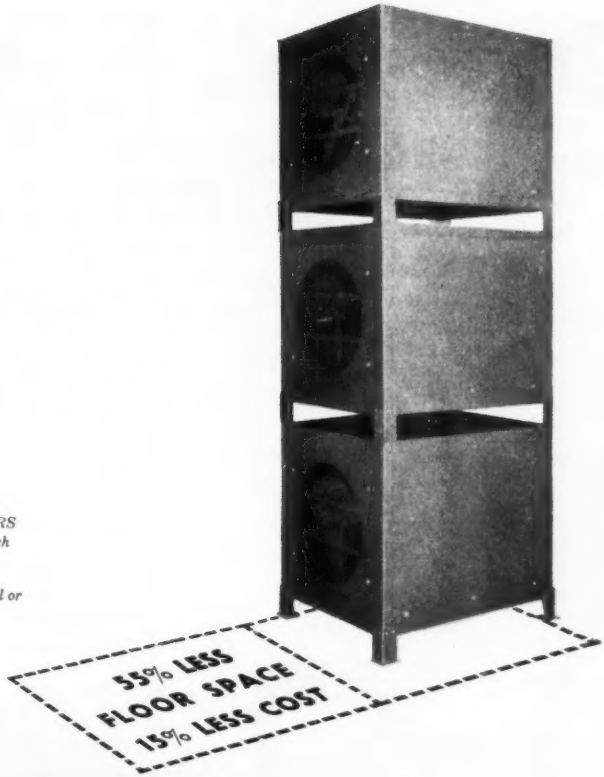


Fig. 8—For the future, Ford will work toward better corrosion protection of these additional areas on an automobile, which are also susceptible to corrosion. Big improvements have been made already. (Photographs courtesy Ford Motor Company, Detroit, Michigan.)



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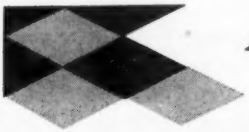

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Adapted for publication in PRODUCTS FINISHING from a paper presented at the American Zinc Institute Annual Meeting.

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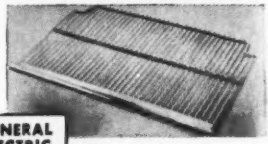

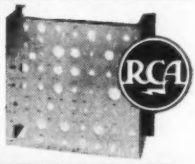

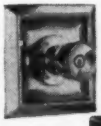

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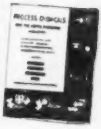

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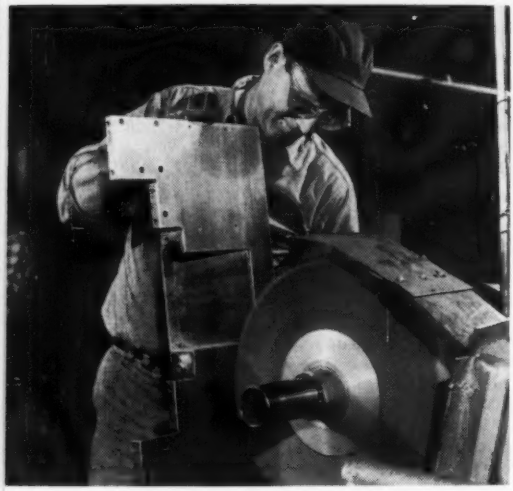
Wunderlich Fabricators, Inc., Bedford, Ohio, finishes 6063T-5 aluminum pipe railing with medium grit and medium density fabric wheel mounted on an air-driven tool which rotates the wheel at 4500 r.p.m.

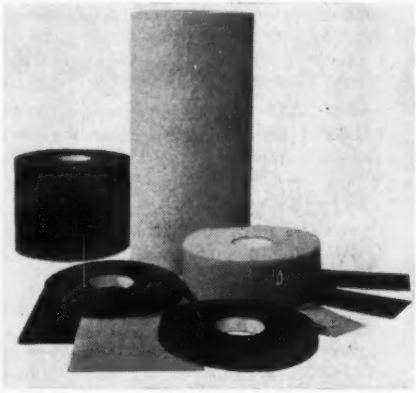


Silicon carbide wheels of medium density and fine grit, with a diameter of 16 inches and width of 6 inches, are producing satin finishes on stainless steel housings for business machines at the Cobbleskill, N. Y., plant of Remington Rand Division, Sperry Rand Corp.

Many Applications for Nylon Abrasive Fabric

A loose fabric impregnated with various abrasives and adhesives is finding a place in many shops, especially where the final finish desired is a matte or "satin" surface.

The product is called Bear-Tex. Made by Behr-Manning Co., Troy, New York, it's not for really taking a "bite"—not for stock removal or removing surface irregularities. Instead, the airy abrasive fabric is at its best in such applications as removing light scale or rust, general cleanup work, blending finishes on adjacent surfaces. Wheels work best at speeds of 2000 to 3000 s.f. p.m., under light pressure.

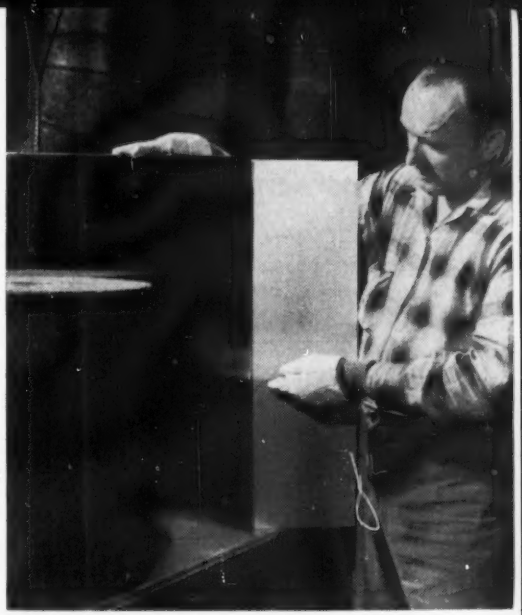


Various forms of Bear-Tex are available.

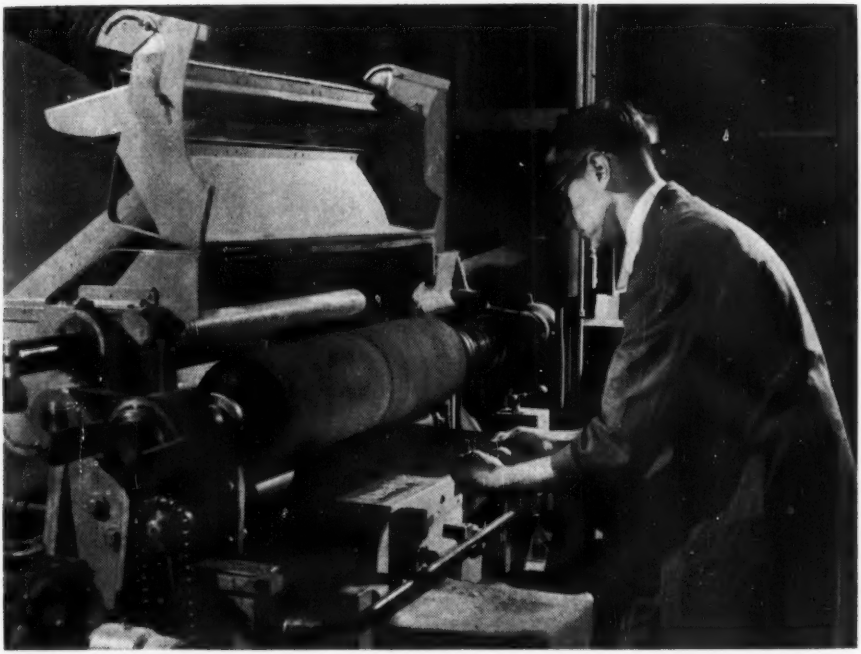
Bear-Tex is available impregnated with garnet, aluminum oxide or silicon carbide abrasives and in various forms such as rolls, sheets, and wheels.

The waterproof abrasive fabric can be used dry or wet—with water, rubbing oils, and compounds.

In California an electronics firm deburrs printed-circuit panels and finishes them in preparation for plating with a Bear-Tex silicon carbide wheel of medium density. It runs at 2400 s.f.p.m., is used offhand. Other applications are shown in the accompanying photos.



Eastern Etchings and Manufacturing Co., Chicopee, Mass., produces dull satin finish at right on aluminum with a fine-grit wheel; Bear-Tex wheel of medium grit produces the bright satin finish on stainless steel at left.



Uniform, streak-free finish is produced on flat sheets of metal by this oscillating Bear-Tex wheel. (Photographs courtesy Behr-Manning Company, Troy, New York.)

Faster Finish for Transformer Cases

Painting and drying small transformer cases presented a real problem at Universal Combustion Co., Tullytown, Pennsylvania. The cases, measuring 5 by 5 by 6 inches, were being spray painted and air-dried, and the most that could be turned out in a normal working day was 500.

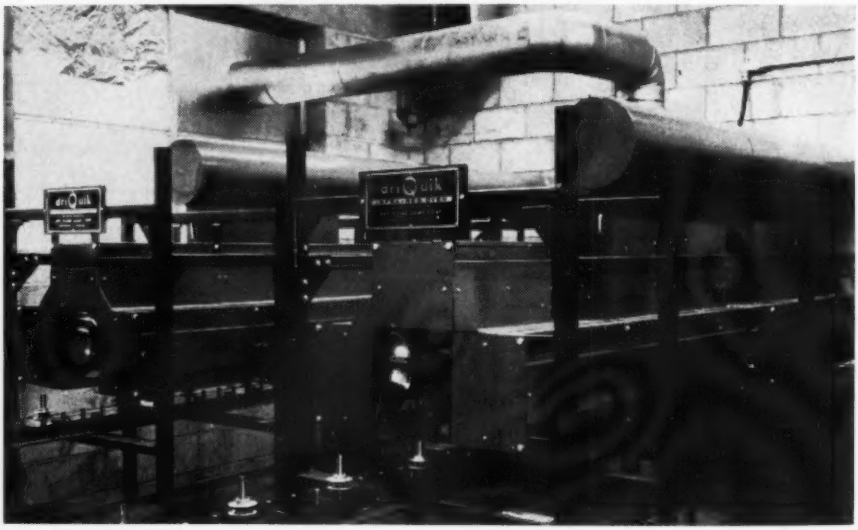
The production bottleneck was also expensive, since the transformer cases had to be stacked in trucks for overnight air drying and then taken out the following day to be packaged.

An engineering survey resulted in a recommendation that Universal Combustion purchase a Binks spindle-type machine for painting and a ceramic-type electric infrared oven for drying the finishes quickly.

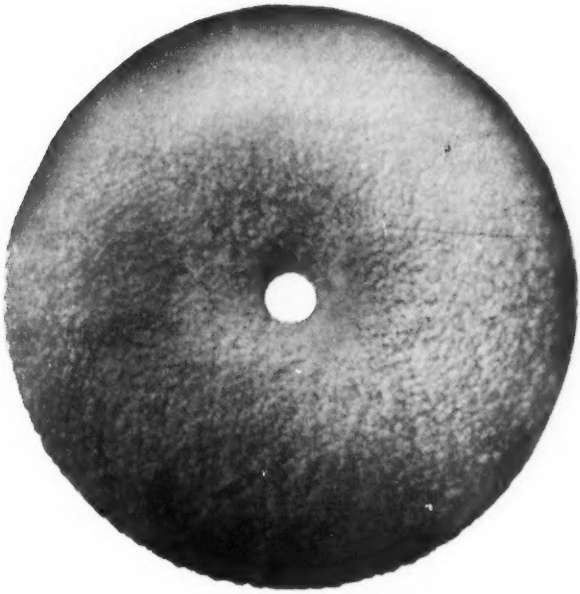
The unpainted transformer cases are put on the spindles, which rotate as they move along the conveyor. The spray gun operator paints each one as it revolves at an even rate while passing by on the conveyor.

Still revolving, each transformer case passes through the infrared oven, which quickly bakes the finish. Temperature in the oven can be set at any temperature up to 550 deg. F. There are two temperature zones.

After installation of the spindle machine and the infrared oven (manufactured by the Dry Clime Lamp Corp., Greensburg, Indiana), production jumped to 400 an hour (from 500 a day) with an improvement in quality of finish. Labor is reduced because one man both loads and unloads the conveyor.



Spindle conveyor enters U-shaped infrared oven which bakes paint on small transformer cases. (Photograph courtesy Universal Combustion Co. and Dry Clime Lamp Corporation.)



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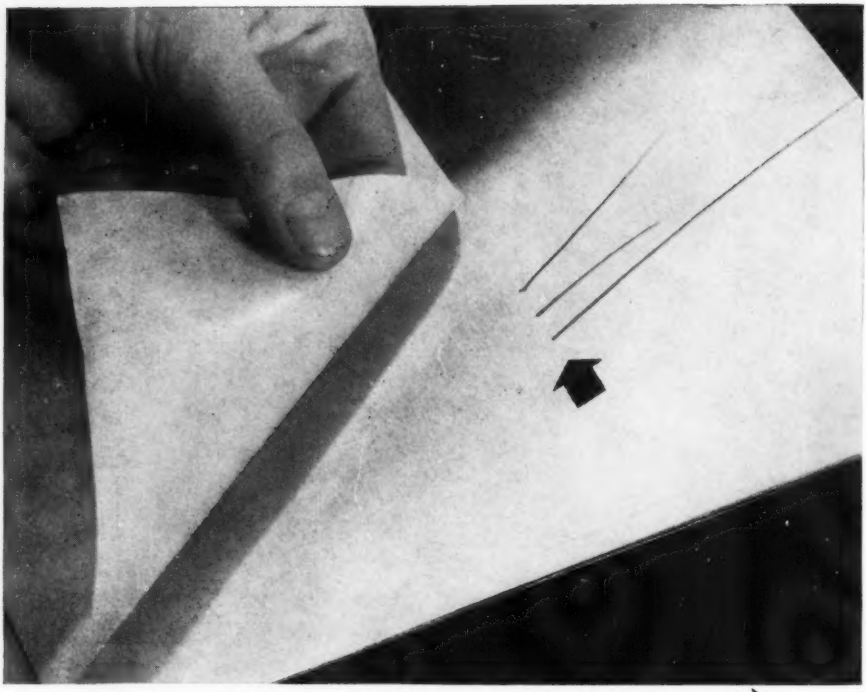

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Metallized Plastic Bonded to Aluminum Results in Flashy Product

A rubber-based adhesive provides the "steel grip" required for development of a new, highly reflective metal that can be bent, drilled, punched, crimped or formed.

Various types of lighting reflectors, decorative trim for radio and TV cabinets, appliances, automobiles, vending machines, flashlight and flashbulb reflectors are among the many uses predicted for a specular or optical-finish reflector sheet called "Dynasyl."

Developed by the W. J. Ruscoe Company, Akron, Ohio, Dynasyl consists of vacuum metallized polyester plastic film permanently bonded to aluminum sheet with a high-strength adhesive produced by Goodyear's Chemical Division.

Mirror-like qualities of a new reflective metal sheet are produced by bonding metallized polyester film to aluminum with a high-strength rubber-based Goodyear adhesive. Called "Dynasyl," the metal sheet can be fabricated in a number of ways for a wide variety of uses, including reflectors for lighting systems. (Photograph courtesy Goodyear Chemical Division, Akron, Ohio.)

The high-lustre, mirror-bright finish has exceptional resistance to most acids, alkalies, greases, oils, solvents and many other chemicals, according to W. J. Ruscoe, president of the firm. Outdoor weathering and salt spray have no harmful effect on the material, he said.

Dynasyl is being used as the reflectors for VHO (very high output) fluorescent lights in several airport runway lighting systems. These are designed for low-visibility landings and give a controlled light which eliminates the "black hole" that exists between incandescent beacon-type lights along runways.

Service station lighting systems are another area of use.

The material will withstand a temperature of 275 deg. F. over an extended period of time.

The adhesive bond between the metallized film and the aluminum sub-surface allows Dynasyl to be shaped without impairing the reflective surface. The material can be formed easily.

Embossed surfaces are another possibility with the film-metal laminate. Almost any texture can be produced for use as decorative trim. Other uses include panel inserts for control boxes, automobiles, vending machines and juke boxes.

Both the reflective and embossed types of material can be produced in sheet form in virtually any size from 0.015 to 0.090 gauge.

Wet Blasting Improves Cleaning at McGraw-Edison

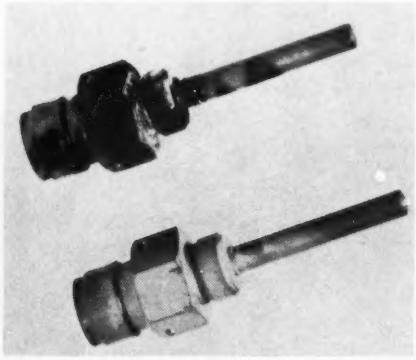
Wet blasting is now used by Thomas A. Edison Industries, McGraw Edison Co., to clean temperature detectors following silver soldering. The change from polish-and-buff finishing methods has increased production from 35 to 150 pieces per hour and has improved the response time of the temperature detector.

The process is conducted in a completely closed cabinet. An abrasive is agitated into a homogeneous water-grit mixture forced out of a blast gun at high velocities by compressed air.

The Consol-Matic, a wet-blast unit made by Pressure Blast Mfg. Co., has two bays at a station, where work is loaded and unloaded. Moving blast guns are positioned at each bay. The operator places parts in either or both bays and depresses the foot lever. This begins the movement and activation of the blast guns. A pre-set timer determines the length of blast time as well as the speed of gun oscillation.

WET BLAST UNIT has decreased costs, increased production and improved the product.

The unit operates on the aspiration system, which eliminates the need for a pumping mechanism in the blast circuit. Employing fine abrasives (up to 5000 mesh), the Consol-Matic produces a fine, satin surface without heavy etching, stock removal or distortion.



BEFORE AND AFTER WET BLASTING PROCESS shows how temperature detectors are cleaned and finished at McGraw Edison Company. (Photo courtesy Pressure Blast Mfg. Company.)

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Tumbling Barrels Cut Costs at Parker Pen

A series of tumbling barrels has cut costs and increased production for Parker Pen Company.

Parker now tumble finishes a multitude of small parts in the compartments of 12 Type F two-barrel ma-

(continued)

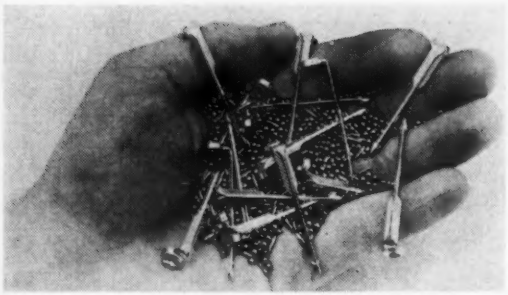


Fig. 1—Steel and brass parts shown here are finished by a multiple tumbling barrel operation. Finishing process was established through a cooperative effort between Tumb-L-Matic, Inc., and Parker Pen Company.

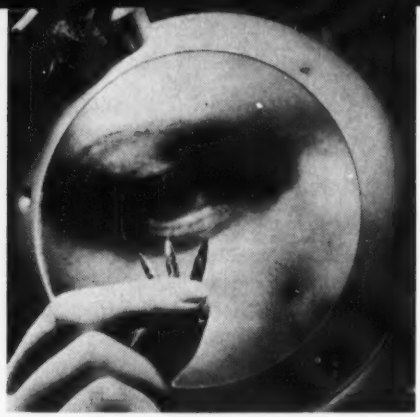


Fig. 3—Inspection of parts is now conducted through a spot check system at Parker Pen Company. Reject rate is low. Prior to the utilization of the tumbling process, 100 per cent inspection of each piece was the rule.

chines built by Tumb-L-Matic, Stamford, Conn.

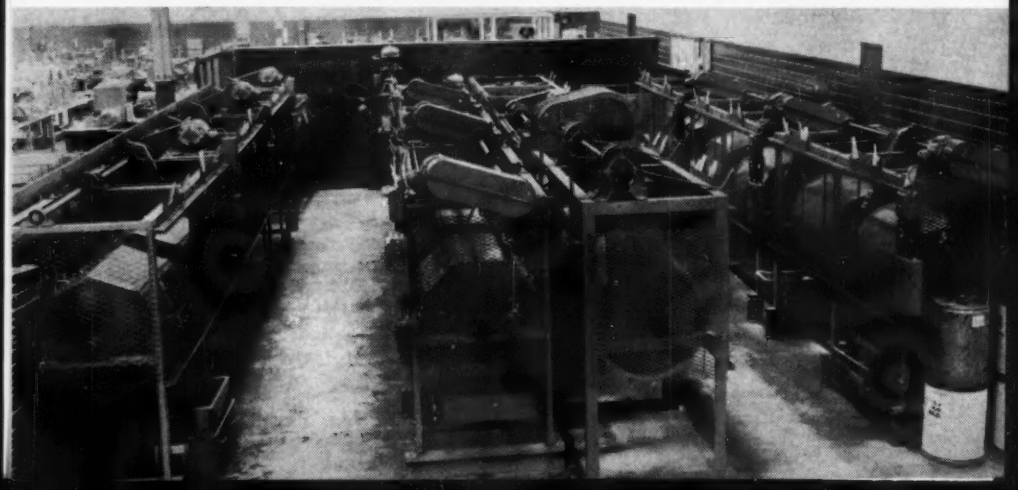
In certain instances, the parts now being used could not be produced without the tumbling machines. Such parts are of shapes and sizes that could not be finished by other methods except at extremely high cost.

Uniformity of the parts finished in these barrels is excellent, allowing the company to replace its former method of 100 per cent inspection with spot checking.

Each of the tumbling machines at Parker pen has two barrels driven by a single motor and reduction unit. Clutches allow the barrels to be stopped and started individually, so that optimum speed and processing time can be selected for each of the operations.

Since each of the barrels is divided into two compartments, large production runs can be divided into small loads, which, Parker has found, re-

Fig. 2—Parker Pen Company's tumbling department has 12 two-barrel dry tumbling units. Each unit contains four compartments (two compartments to each barrel).



sults in finer finishes than could otherwise be obtained.

Most parts are processed in two steps: cut-down in the first cycle, polishing in the second.

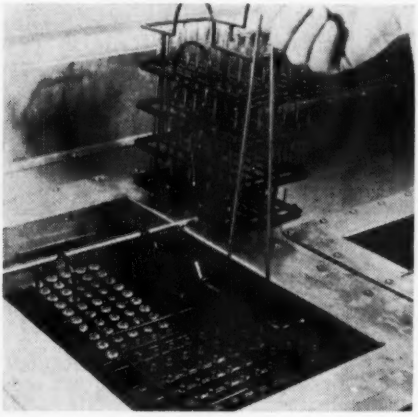
★ ★ ★

Nylon-Clad Baskets Cut Fixture Costs, Reduce Damage During Ultrasonic Cleaning

Nylon clad wire baskets are eliminating costly damage to highly polished precision parts during handling and ultrasonic cleaning operations at The Barden Corporation, Danbury, Conn.

The new baskets are 40 per cent less costly than previously used stainless steel fixtures. Fabricated by

(continued)



***NYLON-CLAD BASKET** in the cleaning tank, ready for ultrasonic "scrubbing." Special nylon-clad pins hold delicate parts during processing. Baskets stack when not in use. (Photo courtesy Wiretex Manufacturing Company, Incorporated, Bridgeport, Connecticut.)*

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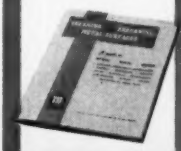

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Nylon-Clad Baskets . . .

Wiretex Manufacturing Co., Inc., Bridgeport, Conn., and nylon clad by Plastonics, Inc., East Hartford, Conn., the new fixtures have virtually eliminated damage that was previously caused by metal-to-metal contact between ball bearing parts and metal baskets. The resilient nylon coating prevents contact.

The baskets, used in cleaning ball bearing parts, have five rows of 10 pins each. One bearing part is placed on each pin. Because the Plastonics process of nylon coating the wire assures uniform 0.012-inch thickness, the bore of the ball bearing part passes smoothly over the pin. The nylon coating is free from any drip marks or coating build-up that might cause difficulty in loading baskets.

Throughout the rigorous cleaning operations, parts cannot come in contact with each other or with the basket frame; this virtually eliminates small scratches that would cause immediate rejection of the highly polished bearing surfaces. Parts handling, another potential cause of bearing damage, is also reduced.

The baskets are used in Barden's "clean" rooms, where air is filtered and temperature and humidity are carefully controlled. Various sizes of rings, shafts and special shaped parts, machined to extreme accuracy and with certain areas highly polished, are cleaned in the nylon-coated baskets.

Ultrasonic energy is provided by a Model LG-150 generator and series

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LTH-60 transducers, products of Branson Instruments, Inc., Ultrasonic Power Div., Stamford, Conn. The resulting cavitation in the cleaning solution literally scrubs the parts clean of any contaminants left during lapping and grinding.

After immersion for a short interval in the cleaning tank, the basket is removed with the parts microscopically clean. Parts are cleaned in this manner several times in the course of operations carried on in the "clean" rooms.

★ ★ ★

Coating for Incinerators Withstands Heat

Kitchen incinerators made by the Majestic Company of Huntington, Indiana, are designed to stay cool during operation. But burning certain materials generates a lot of heat and occasionally the cabinet is heated above room temperature. Thus the finish on the cabinet must be able to take heat without peeling, flaking or loss of color.

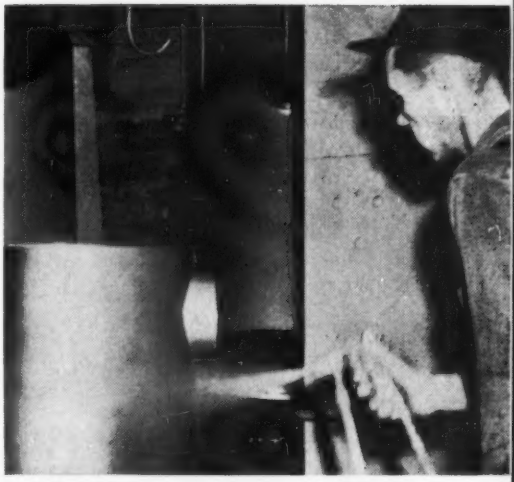
Majestic uses a silicone-base paint that withstands the temperatures encountered. A product of Midland Industrial Finishes Co., Waukegan, it's called Sicon. The silicone finish is spray applied, retains its film integrity at temperatures up to 500 deg. F.

★ ★ ★

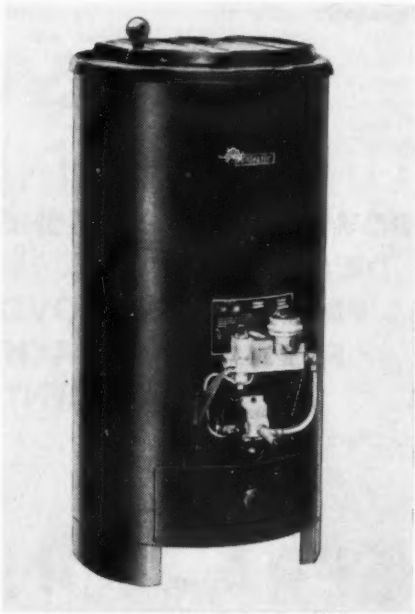
Waste Incinerator: Safe Cyanide Disposal

GM's Oldsmobile Division now burns cyanide wastes in a specially designed incinerator. Combustion

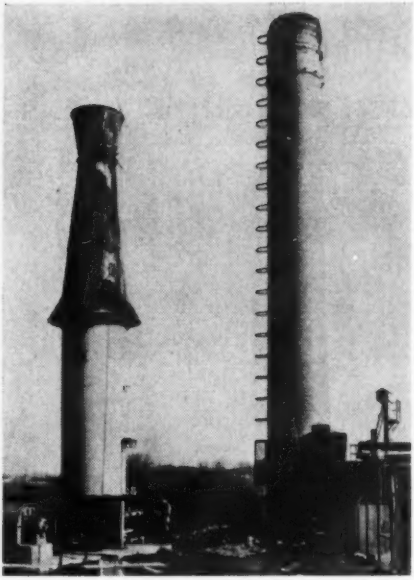
(continued)



Silicone finish being sprayed on Majestic Model ESO-1 Incinerator. (Photos courtesy Midland Industrial Finishes Co., Waukegan.)



Incinerator cabinet with silicone finish.



Waste Incinerator . . .

efficiency of the incinerator is such that no detectable amounts of cyanide are present in the exhaust stream. The installation has been inspected and approved by the Michigan State Division of Occupational Health.

The incineration system is the brainchild of engineers at Prenco Manufacturing Co. of Royal Oak, Michigan. It consists basically of a giant refractory-lined steel stack, a

New incinerator at left is in fenced area on company's waste disposal site. Engineer checking performance gives an idea of size. The stack stands over 50 feet high.

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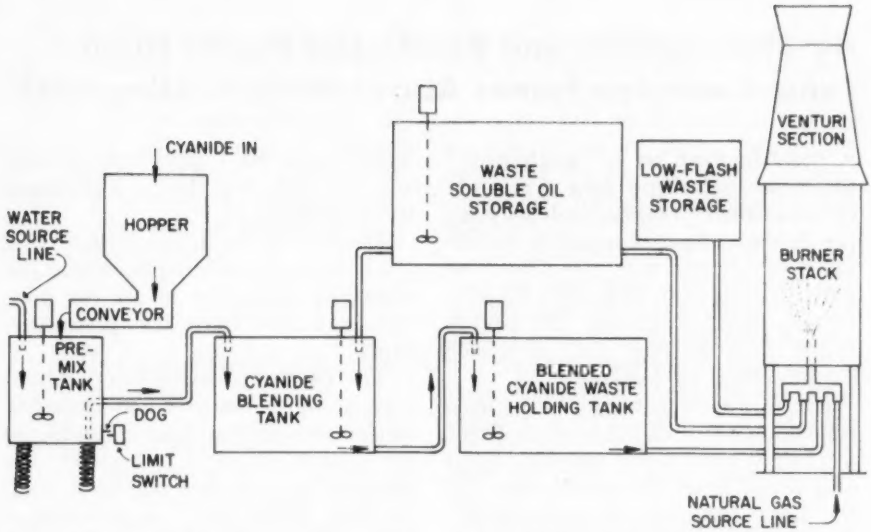


Schematic drawing shows system operating in normal cycle disposing of blended soluble oil-cyanide wastes. Cyanide enters hopper from above, is transferred to pre-mix tank by screw conveyor. Pre-mix tank is supported on springs; when proper weight of cyanide waste has entered tank, springs deflect and cause dog to trip limit switch which shuts off conveyor. Measured amount of water is added and thoroughly mixed with waste to form a slurry, which is then pumped to blending tank. In blending tank measured amount of waste soluble oil is added. Thorough agitation blends the oil with the slurry to proper consistency for incineration. Thoroughly blended waste material is pumped to blended waste holding tank from where it is pumped under controlled pressure to burner. System is designed to permit use of natural gas to bring burner to temperature and to permit burn-off of either soluble oil waste or low-flash waste in addition to the blended waste. (Photos courtesy Prenco Mfg. Corp., Royal Oak, Michigan.)

burner unit and suitable storage tanks, hoppers, mixing vats, pumps, valves and controls.

Complex cyanide wastes are delivered to the burner site, mixed with waste soluble oils, and burned at high temperatures.

The result is complete disposal. There is no detectable pollution of the air; and since it is no longer necessary to utilize public bodies of water for disposal, there is absolutely no danger of stream pollution.

The Prenco system has holding tanks for oil-blended cyanide slurry, soluble oil wastes and low-flash wastes. The line to the burner can be opened to admit any of the following:

1. Cyanide-soluble oil blend.
2. Soluble oil alone.
3. Low-flash waste alone.

The burner will handle any of these without altering any burner components and without changing any controls.

PRODUCTS FINISHING DIRECTORY
Your buyers' guide

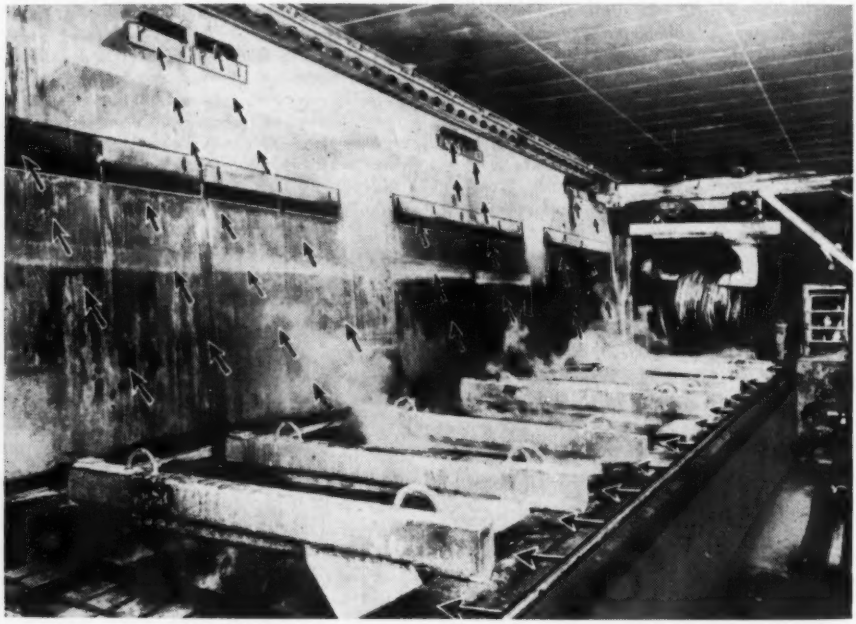
Air-Flow System and Reinforced Plastic Hood Tame Corrosive Fumes Above Wire-Pickling Bath

A combination of a "push-pull" air-flow technique and a chemical-resistant reinforced-polyester fume-collector hood is whisking away fumes that rise from the wire pickling bath at the Rock Falls, Illinois plant of Russell, Burdsall & Ward Bolt & Nut Co., a major manufacturer of fasteners.

Air is forced through holes in a pipe on one side of the tank to direct the fumes toward the collector hood and away from the work area. At the same time, the fume-laden air directly above the pickling tank, which contains 8 per cent sulfuric acid at 180 deg. F., is exhausted through the hood.

To prevent the fumes from hitting the hood and bouncing back into the room, 10 cubic feet of air per minute is forced from the perforated pipe.

The plastic collector hood, which runs along one side of the tank, has performed without any sign of deterioration for over two years. It's made of bisphenol A polyester resin (called Atlac 382), a product of Atlas Chemical Industries, Inc.



Plastic hoods catch corrosive fumes rising from wire-pickling bath. Pipe at right pushes them toward hoods. (Photograph courtesy Atlas Chemical Industries, Inc., Wilmington, Delaware.)

The entire installation was designed and fabricated by Heil Process Equipment Co. of Cleveland.

The pickling area also has bisphenol A glass-reinforced panels used as a facing for the ceiling. The panels, 2 by 5 by 1/16 inch thick, protect the ceiling structure from the corrosive fumes.

★ ★ ★

Panel-Coil Heating and Cooling of Process Solutions

During recent years the use of panel-type heat exchangers has increased. The panel-type units have certain advantages of construction, and operation, which appeal to the finishing engineer. They may be fabricated of any metal that may be formed and welded, thus resistance to most solutions can be "built in."

The panel-type heat exchangers are manufactured by welding together two sheets of metal previously embossed to form channels. The heating or cooling medium flows through these channels.

Either one or both of the sheets may be embossed, according to the specific service requirements of the application. For conducting steam, the channels provide parallel steam flow; when liquids are used, the channels are in series. Many special flow designs have been developed by the manufacturers to meet user requirements.

The heating units are fabricated so that they may be suspended from one side of a processing tank. Steam and condensate lines (for example) may

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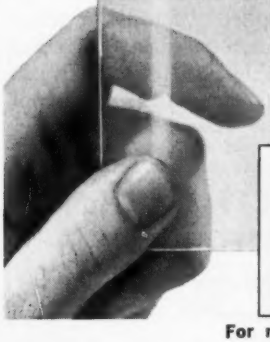

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Table I

SOLUTION	SUGGESTED METAL OR SURFACE TREATMENT FOR HEATER
Dull nickel plating solution	Lead-covered steel
Sulfuric acid pickling solution	Lead-covered steel
Sodium cyanide solutions Cyanide plating solutions	Iron
Bright nickel solutions	Hard-rubber-covered steel or pure nickel
Fluoborate nickel plating solutions	Hard-rubber-covered steel

then be connected quickly to the inlet and outlet pipes welded in each end of the heating or cooling unit. The embossed panels should be hung in the tank so that a minimum of 1½ inches of space is between the tank wall and the heating unit.

Like any other heat exchanger operating immersed in a process solution, the panel type heater must be kept free from sludge and scale. Its construction makes it easy for the maintenance man to remove the unit, clean it and return it to its place quickly.

Recommendations for the metal or surface protection to be used for immersion heaters in various processing solutions are given in Table I.

Panels used in plating tanks must be *behind* the anodes to prevent plating the panels, and they must be insulated from the tank and the plating circuit.

Panel-type heating coils are commonly fabricated from cold-rolled steel, stainless steel (all types), Monel, Inconel, nickel, Carpenter 20. Coatings applied include: rubber, Neoprene, Heresite, plastics, Teflon, Kel-F, zinc, lead, tin, chromium, copper, nickel, and other specified coatings.

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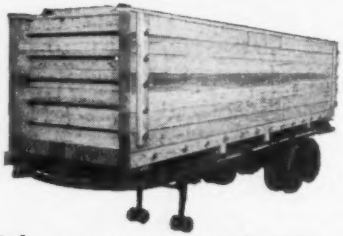

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The Meaker "Automatic" was chosen and installed four years ago to zinc plate switch mounting plates and relay covers. These are parts of busy telephone central offices—the communication nerve centers of offices and factories throughout the United States.

Since 1899, Meaker engineers have been building automatic metal processing equipment. These range from units tailor-made to fit limited floor space and handle modest output to the largest plating installation in the world!

Whether large or small, every Meaker is made to save its owner money—through lower labor costs, greater plating uniformity and greatly improved product quality. Send for our new catalog "When to Automate" which will give you some valuable ideas on improving your profits—and products—through automatic plating or metal finishing.

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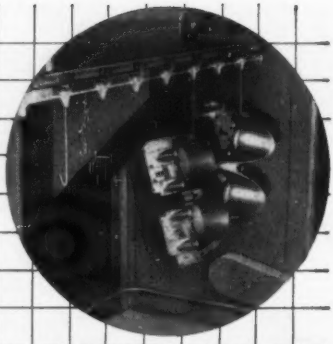

CAPITAL LOSS TURNED INTO PRODUCTION GAIN

from plant ruins to production records in sixty days

One of the toughest rebuilding problems confronting the Clements Mfg. Co. when their Deckerville, Mich., plant was completely demolished by fire, was speedy replacement of the finishing system needed for phosphate coating and painting of its diversified line of automotive diecast and sheetmetal parts.

The new system had to be versatile—had to handle many different sizes and shapes. It had to be inexpensive to operate fuel-wise and labor-wise. Above all, it had to be delivered and installed in a matter of a few days—it had to do a high quality job right from the start—and it had to take up little floor space.

Experienced MOCO design and process engineers rose to the challenge.

First, a 3 stage washing machine for phosphating and rinsing was designed and built at the MOCO plant, and shipped completely finished, except for piping hook-up, directly to the Clements Mfg. Co. plant.

Next, MOCO engineers tackled the drying and paint baking problem. A combination Dry-off and Bake Oven was developed that could dry parts as they came from the washing machine on their way to the spray booths, and bake the painted parts as the conveyor returned them to the oven for a longer period before delivery to the conveyor unloading station.

The Dry-off and Bake Oven was too large to ship already assembled, but MOCO's unitized design made assembly at the Clements Mfg. Co. plant a relatively simple matter.

Within 60 days of the disaster, the Clements Manufacturing Company plant was back in full operation with production at a higher level than ever before, thanks to MOCO ingenuity, engineering skill and desire to serve its customers. MOCO problem-solvers will welcome the opportunity to serve you.

Write for the name of our representative nearest you.

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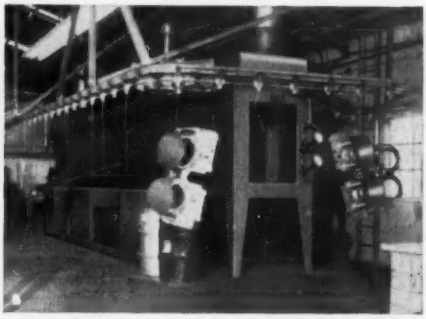
A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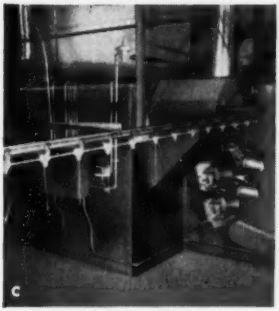
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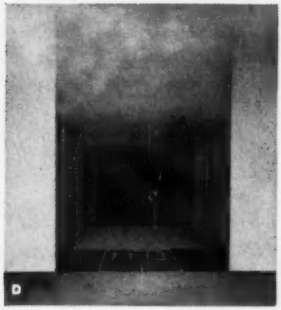
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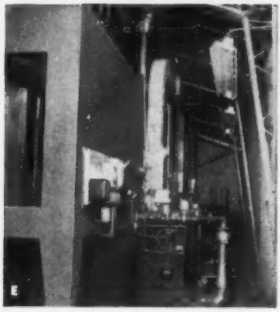
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A—Sixty days after the Clements Mfg. Co. plant was burned to the ground this finishing system was in operation in the rebuilt plant. In the right foreground workers are loading and unloading parts. Behind them is the MOCO Washing Machine. On the left, paint spray booths hide the MOCO combination dry-off and paint baking oven. B—Start of the completely conveyorized finishing cycle. From loading station at left parts enter MOCO 3 stage washing machine for washing, rinsing and phosphate coating. C—Finishing parts coming out of combination dry-off and bake oven on their way to unloading station. D—Entrance view of phosphating machine indicating risers, nozzles, street els, drain decks, access walkways, spray zone silhouettes shown immediately after pump stopped. E—3 stage MOCO washing machine showing tanks, fill and overflow pipes and valves, pumps, burners, controls and exhaust ducts.

60-60A

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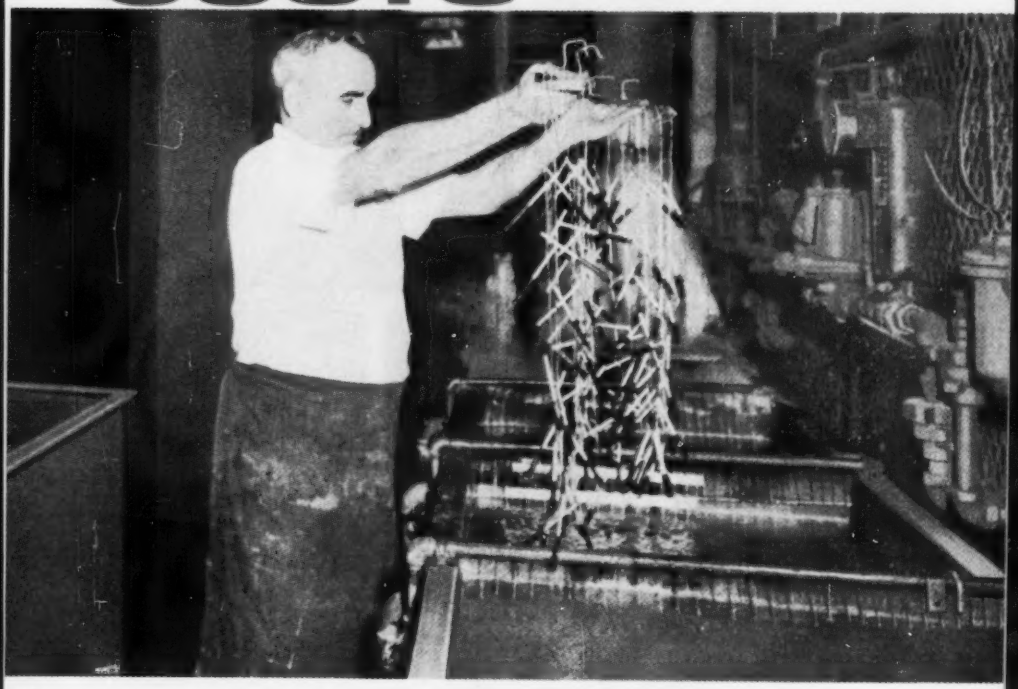

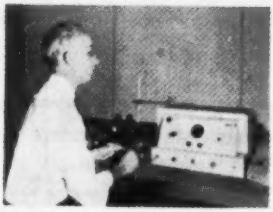

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Uniformity of deposit eliminates hard spots after heat treating. Subsequent machining operations, such as tapping and drilling, are simplified. Rejects are greatly reduced.

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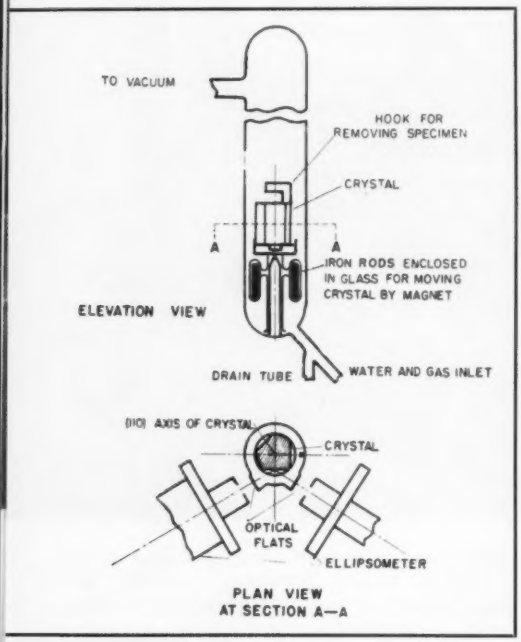

Fig. 1—Diagram of the apparatus used at the National Bureau of Standards to study the formation of oxide films on metal surfaces. The four different surfaces cut parallel to the crystal axis are indicated in the plan view (bottom).

Growth Rate of Oxide Films on Copper

To provide basic data on the mechanisms involved in the corrosion of metals, the National Bureau of Standards is investigating the thin oxide films that sometimes form on metal surfaces during the corrosion process.

In recent work, the thicknesses of such films were measured as they increased on 4 different crystallographic planes of copper single crystals immersed in oxygenated water. The measurements indicated that the type of oxide formed, its rate of growth, and its thermodynamic stability were greatly influenced by changes in oxygen concentration. The study, partially sponsored by the Corrosion Research Council, was made by Dr. Jerome Kruger of the Bureau's metallurgy laboratories.[1]

In an earlier Bureau study[2] of the chemical composition of the films

(continued on page 102)

Amer-Plate has the 1-2 punch that whips tank lining problems

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formed on copper surfaces, it was found that both cuprous oxide and cupric oxide were produced. The first oxide formed as a vari-colored adherent layer on the metal surface and the second as a powdery outer layer. The present work was undertaken to obtain data on the rate of cuprous oxide formation, and to ascertain whether different oxygen concentrations affected film formation and stability under controlled laboratory conditions.

The copper single crystals used in the study were cylindrical in shape, approximately $\frac{5}{8}$ inch in diameter and 1 inch in length, with their axes parallel to the (110) crystallographic plane. This orientation permitted flat surfaces to be cut on the crystals parallel to the (110), (111), (100), and (3 1 1) planes.

When a specimen prepared in this manner had been mounted on a glass stage, it was sealed in a closed all-glass apparatus. Two small iron bars were fitted into the glass stage so that the mounted specimen could be rotated magnetically about its axis to any desired position. Thus as films formed on the various crystallographic planes during the oxidation process, they could be measured with a polarizing spectro-

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". . . cupric oxide precipitated on the cuprous oxide-copper surface when its solubility-product constant was exceeded."

meter. This instrument, also called an ellipsometer, measures thicknesses to plus or minus 3 A or better by means of refractive-index techniques.

In the first experiment with this equipment, a specimen was immersed in a solution of oxygen and pure water in equilibrium with pure oxygen at a pressure of 1 atmosphere. Rapid oxidation in the form of cuprous oxide occurred initially on the specimen and then leveled off for a period of from 90 to 120 minutes on the different planes, after which cupric oxide started to form. Limiting thicknesses of the first coating ranged from 65 A to 95 A on the four surfaces.

Spectrochemical analysis of the solution both before and after cupric oxide was observed showed the copper concentration in the solution to be less than 0.02 mg./l. in the first instance and 0.04 mg./l. in the second. This change in copper concentration indicated that cupric oxide precipitated on the cuprous oxide-copper surface when its solubility-product constant was exceeded.

In the next experiment, the same environmental conditions were employed except that the liquid was stirred by bubbling in pure oxygen at increasing rates. Almost the same behavior was noted; however, with each increase in stirring rate a great-

(continued)

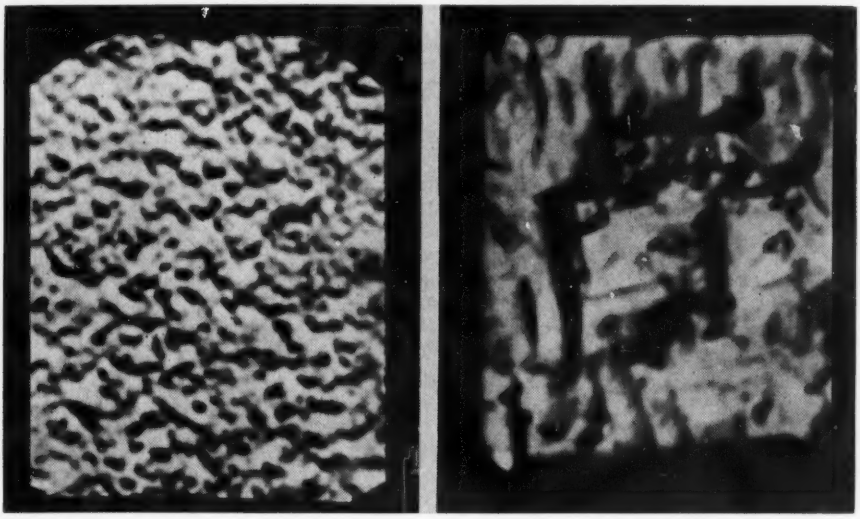

Fig. 2—Electron micrographs of the (111) surface (left), and the (311) surface (right), of a copper single crystal after exposure to a 1 per cent oxygen atmosphere in an NBS experiment. (40,000X). These micrographs illustrate the discontinuous nature of the films formed on crystallographic planes with different orientations.

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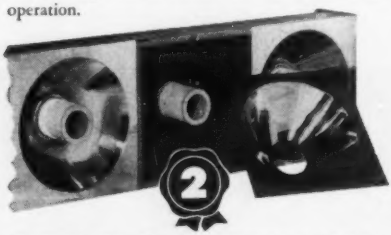

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er period of time elapsed before the first traces of cupric oxide appeared. This reaction tends to confirm the conclusions derived from the first experiment. Apparently the stirring carried the cupric ions away from the surface, with precipitation occurring in the body of the liquid. Thus additional time was required for cupric oxide to precipitate at the surface in an amount sufficient to affect the oxidation process.

Only 1 per cent oxygen was used in the next experiment, with the total pressure brought up to 1 atmosphere by the addition of helium.

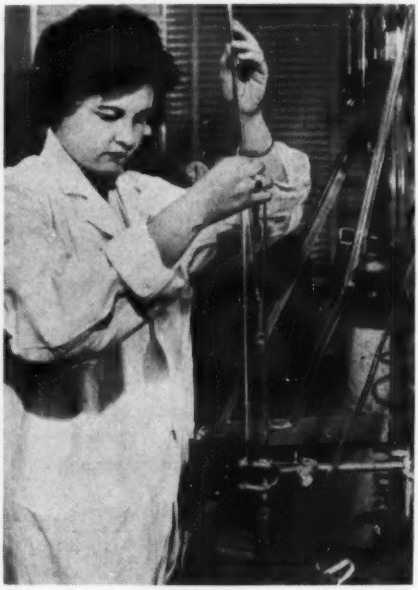

Fig. 3—Joan Calvert carefully inserts a specimen into the apparatus used at the National Bureau of Standards to study the formation of oxide films on metal surfaces. Film thicknesses are measured with a polarizing spectrometer (center bottom).

With this combination, the rate of cuprous oxide formation appeared to follow a parabolic law, indicating that a diffusion process was controlling the growth rate. The film formed on the specimen exhibited rate constants of approximately 0.13 A^2/min. on the (111) plane, and 0.63 A^2/ min. on the other three planes. This marked difference in rate constants indicates that diffusion of copper ions through the film, rather than diffusion of oxygen in solution, controls the growth rate of corrosion products.

A thickness of 160 A was attained at the end of 300 minutes; the measurements were then discontinued because a gradual change in refractive index took place. However, film thicknesses greater than those produced by the pure oxygen atmosphere formed on all planes.

When a 10 per cent oxygen-helium atmosphere was used, lesser film thicknesses were found than in the 1 per cent oxygen-helium mixture, but these thicknesses were always greater than those observed in the pure oxygen atmosphere. When the oxygen was increased to 20 per cent, the behavior approached that observed in the pure oxygen experiment, with cupric oxide appearing at the end of 240 minutes.

From the results of the study it

(continued)

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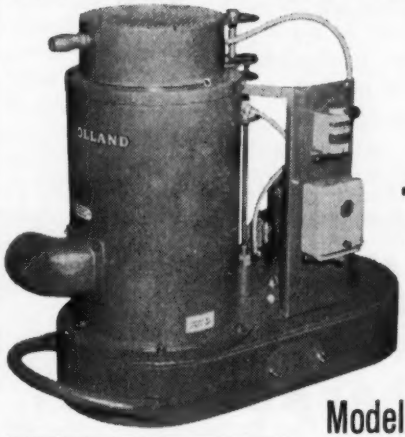

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Oxide Films on Copper . . .

appears that at low oxygen concentrations the cuprous oxide film is the stable phase, and that it grows to greater thicknesses than it does at high oxygen concentrations. Under the latter conditions, cupric oxide becomes the stable phase. The study showed that in both high and low concentrations, the (111) crystallographic plane exhibits the smallest rate of oxidation, possibly because it has the highest work function—that is, gives up its electrons less readily than do all of the other planes in the face-centered cubic space lattice of copper.

REFERENCES

1. For further technical details, see "The Oxide Films Formed on Copper Single Crystal Surfaces in Water: II. Rate of Growth at Room Temperature," by Jerome Kruger, J. Electrochem. Soc. *108*, 503 (1961).
2. "The Oxide Films Formed on Copper Single Crystal Surfaces in Water: I. Nature of Films Formed at Room Temperature," by Jerome Kruger, J. Electrochem. Soc. *106*, 847 (1959); also, Corrosion Research, NBC Tech. News Bull. *43*, 150 (1959).

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NEW BOOKS . . .

The Practical Anodising of Aluminium. By Dr. Walter W. E. Hubner and Dipl. -ing A. Schiltknecht. Translated by Winifred Lewis. Published by MacDonald & Evans, 8 John St., London, W.C. 1. 350 pages. Price, 55/-d.net.

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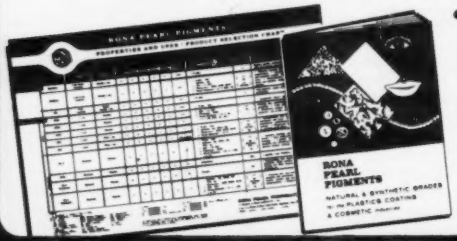

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Nickel-Chromium Plating. A book that contains the record of a one-day symposium on recent developments in nickel-chromium plating. Organized by the London Branch of the Institute of Metal Finishing, this symposium included four papers plus lengthy discussion period. Includes papers reviewing developments in decorative plating, corrosion resistance, acceptance requirements, problem-solving. Copy may be secured from Robert Draper, Ltd., 85 Udney Park Rd., Teddington, Middlesex, England. 132 pages. Price, 25s.

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Rigid Polyvinyl Chloride Catalog. A 25-page catalog describes Kaykor rigid polyvinyl chloride, the products that are produced from it, its physical and chemical properties, design and fabrication, applications. Catalog RV-61, Kaykor Products Corp., Yardville, N. J.

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FINISHING CLINIC

Electroplating on Non-Conductors

Question: *We plan to electroplate non-conductors.*

Could you tell us what companies produce conductive paints?

Also, we would like to receive your magazine.

C. L. E.

Answer: We regret that we cannot give you the names and addresses of companies which produce conductive paints. However, the 1961 PRODUCTS FINISHING DIRECTORY lists quite a number of manufacturers of enamel, lacquer and other paint products. You might look at the list of manufacturers of lacquer beginning on page 132. Inquiries directed to these companies will enable you to find a source for the conductive paint which you would like to purchase.

We will be glad to send you PRODUCTS FINISHING.

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Hydrogen Embrittlement

Question: *We have been having trouble with nickel plated annealed copper tubing of ¼ inch diameter (0.025 inch wall) becoming hardened or embrittled so that it will break on the least bending.*

The plating is not buffed or treated in any way. The purpose of the plating is merely to prevent oxidation when the copper is exposed to high temperatures.

Under a microscope the surface of the fractures shows a coarse, crystalline growth—altogether different from the fracture of an unplated tube.

Have you any information on this subject or a suggestion as to its cause?

V. C. B.

Answer: There is some hydrogen embrittlement that occurs during nickel plating, but this is usually not sufficient to cause trouble if the plating solution is operated at the proper current density, pH and solution concentration.

Your plating chemicals supplier can tell you whether or not your solution is operating properly. For further information, write the companies listed under "Plating Processes and/or chemicals, nickel," on page 197 of the 1961 PRODUCTS FINISHING DIRECTORY.

Technical representatives from these companies can assist you in developing a plating process that minimizes hydrogen embrittlement.

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Accelerated Corrosion Tests

Question: *Please tell me where I can obtain the specification for Cass and Corrodkote Tests on electrodeposited coatings. These tests were mentioned in your article, "Plating and Anodizing Aluminum and Magnesium," reported by Gerard H. Poll, Jr., Associate Editor.*

I. I. K.

Answer: The Corrodkote test is conducted by formulating a paste of the following composition: cupric nitrate —0.035 gm.; ferric chloride—0.165 gm.; ammonium chloride—1.0 gm.; kaolin—30.0 gm.; water—50.00 ml. and rubbing this paste on plated samples which have been cleaned. Samples are then placed in a humidity cabinet for 20 hours at 100 deg. F. and 100 per cent humidity.

Each exposure of 20 hours is considered to be one test or cycle. Sometimes, samples must be exposed for a second or third test run before failure. One cycle of 20 hours, however, is considered to be the equivalent of service life in Detroit, Michigan over one winter.

The Cass Test (an abbreviation for "Copper-Accelerated Acetic Acid Salt Spray Test"), is conducted in a salt spray test cabinet using this solution: sodium chloride—5 per cent by weight; water—95 per cent by weight; cupric chloride—1 gm. per gal.; glacial acetic acid added to adjust pH to 3.0-3.2.

The test conditions are as follows: cabinet temperature — 120 deg. F.; saturator tower temperature—135 deg. F.; air pressure—15 p.s.i.; collection rate—1.5 ml. per hour per 80 sq. cm.; pH of collected solution—3.2.

Sixteen hours in a salt spray cabinet in which this solution and testing conditions are used is considered to be the equivalent of one years' service in an area like Detroit, Michigan.

The Cass test has been found to be much superior to the old salt spray test from the standpoint of reproducibility and accelerated corrosion.

Using either test, it is now possible to estimate in 24 hours whether or not a plated coating will stand up for one year in severe outdoor service.

For further information about testing, write to the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

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Finishing Clinic . . .

Testing Paint Adhesion

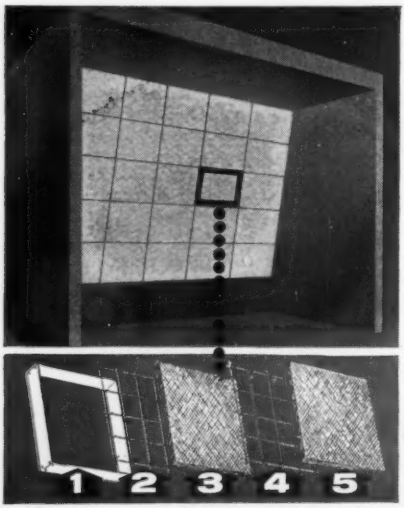
Question: *Please forward reprints of "Painters' Problems" and "How to Anodize and Color Aluminum." If you have a reprint on paint-adhesion tests, we would appreciate a copy. If you do not, perhaps you can tell us where we can purchase a paper on testing of paint adhesion on brass.*

J. P. C.

Answer: The reprints you requested are enclosed. We regret that we do not have any reprints of articles on paint-adhesion tests. You may be interested, however, in the following discussion of adhesion testing from "Resin Review," a publication of Rohm and Haas Co.

"Measurements of a property, often referred to as 'adhesion,' are generally made via subjective evaluation with a penknife or by a form of peel test in which a cross-hatch of lines is cut through the coating and an adhesive tape is then used to remove loose sections of material. In these tests, it is evident that the cohesive as well as adhesive properties of a coating are of importance. For coatings of equivalent true adhesion, high tensile modulus or low flexibility generally contribute to poor performance. In many ways the term "adhesion" is a misnomer for knife or cross-hatch tests.

"There are today several research methods for determining, directly, the adhesion of a coating. However, because of high cost for instrumentation, slow and often complex manipulation techniques, and the necessity for skilled operators, these methods are reasonably unattractive for routine evaluation work. Further, it is questionable that an expression of actual adhesion would have direct meaning in terms of the tests currently used in the coatings industry.



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"Despite the ultimate desirability of a test which measures adhesion alone, there is some justification for investigating quantitative tests which correlate with current knife and cross-hatch measurements.

"Thus, the quantitative test would not give results which depend upon adhesive strength alone. The test results should vary with cohesive as well as adhesive properties in a manner such that correlation is obtained with present qualitative test methods.

"The Acro Microknife. This instrument utilizes a 60-degree conical diamond point to cut a straight line through a film to the substrate. A motor drive insures constant rate of cutting. A lever arrangement carrying a beam and weights permits application of a measured variable load to the diamond point. The instrument has a movable stage operated by means of a calibrated micrometer screw. Thus the platform holding the test panel

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may be moved by a known amount in a direction perpendicular to the cut. Several cuts may be made at a distance 'd' from each other.

"The load on the diamond point, L, is adjustable from zero to one thousand grams. The transverse displacement, d, is adjustable in one-mil intervals from one mil upward.

"The cutting action of the diamond point causes a transverse strain in the coating. This strain causes a stress in the adhesive bond between the coating and the substrate. When the transverse displacement, d, between two cuts is sufficiently small, the adhesive forces between coating and substrate are overcome. The coating then strips from the substrate.

"The load on the diamond point is conventionally set at a value such that the coating is penetrated by two passes of the diamond point at one location.

"The value, d, at which failure occurs was found to vary with both the thickness of the coating and the load on the diamond cutting tool."

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Electrolytic Machining Process

Question: *One of your recent issues contained a short article entitled "New Electrolytic Machining Process Shapes Parts in Minutes." Could you furnish us with more detailed information on this machining process?*
N. M. J.

Answer: For more information about this process, we should like to refer you to Dr. Charles L. Faust, Battelle Memorial Institute, 505 King St., Columbus, Ohio, where this process was developed.

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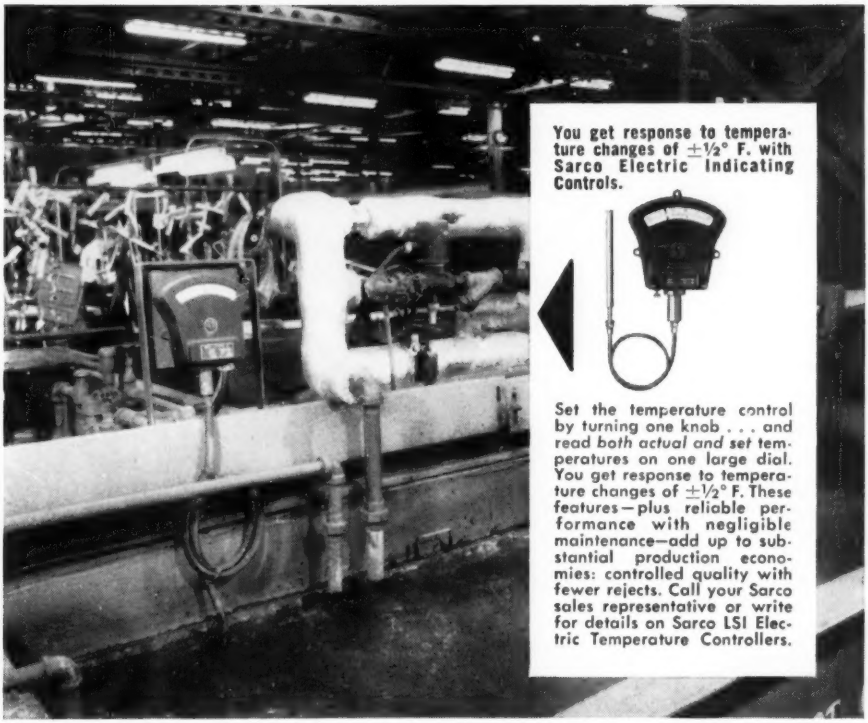
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At the Stratford, Conn., plant of Sikorsky Aircraft Division of United Aircraft Corporation, the parts finishing department uses Sarco Electric Indicating Regulators to control the temperature of baths for cleaning, anodizing, etching and rinsing of precision helicopter parts

How Sikorsky controls temperatures in 50 process tanks with Sarco Electric Indicating Regulators

Fifty process tanks are used for parts finishing at the Stratford, Conn., plant of Sikorsky Aircraft—and temperatures in each are controlled accurately and automatically with Sarco Electric Indicating Regulators. In bath temperatures which range from 95° F. to 210° F., Sikorsky easily holds the temperature to close tolerances for rinsing, etching, anodizing and caustic cleaning of precision helicopter parts. Sikorsky reports that maintenance of their Sarco Electric Indicating Regulators is practically zero. 9777F

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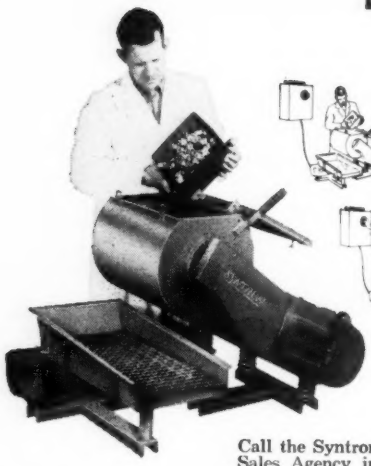

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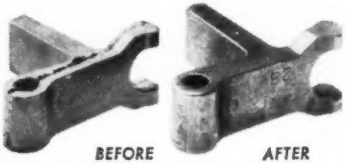

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Tough treatment like this calls for furniture with a really durable finish. Nickel-Chrome Plating is specified because it provides long-lasting resistance to hard wear. It keeps its bright, eye-catching appearance, fights off scratches, scrapes, bumps and stains.

Nickel-Chrome Plating works so well with so many basis metals. It gives designers true flexibility in selecting basis materials for top performance, simplified fabrication, and practical production cost. And it gives metal finishers a coating system that protects the product for years of rugged wear.

For more information on Nickel-Chrome Plating for decorative, protective finishes, write for a copy of *The Contribution of Nickel and Chromium to the Durability of Decorative Plating.* It's yours for the asking.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N.Y.

Inco Nickel *makes plating perform better longer*

EVERGREEN 7-3315
IN BROOKLYN, NEW YORK IS THE
NUMBER TO CALL* FOR THE BEST
BUYS IN REBUILT PLATING, POLISH-
ING AND PAINTING EQUIPMENT
*COLLECT IF YOU'RE FROM OUT OF TOWN
WRITE FOR LATEST DESCRIPTIVE FOLDER... FREE!
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H & S EQUIPMENT SALES, INC.
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NEW BOOKS . . .

"Guide" to D.C. Power Supplies. "Guide" to Semiconductor Power Rectifiers, has been revised and expanded into two volumes, Industrial and Plating, by The Meaker Company, subsidiary of Sel-Rex Corporation, Nutley, New Jersey.

The 56-page booklet describes rectifiers for anodizing, aircraft ground power supplies, battery chargers, capacitor manufacturing, current limiting, electrochemical processing, electron tube testing, relay testing, shop power supplies, and complete semiconductor power conversion systems for the operation of electrolytic cells.

This extensive literature is offered to anyone with a practical or academic interest in semiconductor power conversion equipment. Requests should be on company letterhead, indicating whether electroplating or industrial power supplies literature is wanted.

★ ★ ★

Standard Nomenclature for Industrial Brushes. A system of standard nomenclature for industrial brushing tools has been developed by the Industrial Brush Division, American Brush Manufacturers Association.

The 14-page report is available without charge for single copies through the Association's office, 1900 Arch St., Philadelphia 3, Pa. It is designed to reduce correspondence and misunderstanding between users and producers of industrial brushes by clearly defining terms used in brush specifications.

NUODEX introduces

a series of new high-performance plating baths to complement NUODEX certified plating chemicals.

Two years ago, Nuodex led the industry in bringing you the many advantages of certified metal purity and quality in nickel plating chemicals. Now, with the introduction of high-performance plating baths and brighteners, Nuodex offers you improved control in your plating operations. Each of these four new baths has been specifically developed to overcome and eliminate the more troublesome problems and headaches of nickel and copper production plating.

A new bright nickel process with high leveling properties, high throwing power, ease of control, excellent ductility. May be used with agitated or still bath processes.

A bright barrel process, it may be used in hot barrel solutions or in room temperature baths with equal effectiveness. Simple to maintain and control, it produces highly uniform, bright deposits.

Specifically designed to eliminate stress problems in nickel deposits, it acts as a modifier to reduce high tensile stress to zero or convert it to compressive stress. Produces extremely ductile plate.

This acid copper process has high throwing power, eliminates rough grainy deposits and "treeing" while promoting smooth, hard deposits of high ductility at rapid speeds.

Distributors in principal cities in the U.S.

NUODEX SPECIAL PURPOSE CHEMICALS **PRODUCTS DIVISION** ELIZABETH, NEW JERSEY

HEYDEN NEWPORT CHEMICAL CORPORATION

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NEW PRODUCTS

Mobile Hot Airless Spray Outfit

Nordson Corporation has introduced a dolly-mounted hot airless spray unit, the AP-6800. This mobile model includes a Nordson AP pump and two high-pressure paint heaters and a filter. There is room on the dolly for a standard five gallon bucket of paint. The unit is of particular value where painting is done at several locations or where painting of heavy equipment is done on the open floor.

Manufacturer: Nordson Corporation, Amherst, Ohio.

For more data circle 1 on Postpaid Card

Nordson's dolly-mounted airless spray unit

Roller-Coater Design Improves Concentricity and Coating-Thickness Control

A precision roller coating machine announced by Gasway Corporation is designed to solve the problem of uneven paint distribution in strip-coating lines.

The Gasway machine's coating and doctor rolls *are precision ground on centers and then operated on centers in the coater itself instead of with journal boxes.* In this way paint films can be metered to extremely close tolerances, producing excellent results with thin films. The thinner film makes it possible to effect substantial savings in coating-material cost.

The Gasway precision coater is also designed to minimize loss of production time during changing of rolls. It is possible to change rolls quickly (average time 60 seconds) because the machine has been designed with retractable centers which move away or come up to the roll in much the same way this operation is performed on the tailstock of a lathe. When changing rolls the operator simply retracts the center by means of adjusting screw device, removes and replaces the roll,

(continued)

NEW 'ENPLATE' chemical plating baths plate without electric current

CHEMICAL PLATING

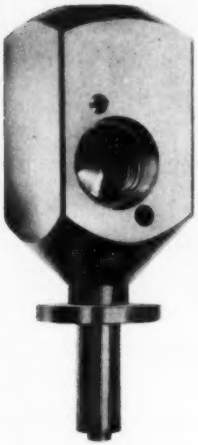

PLATE HARD NICKEL
OF UNIFORM THICKNESS ALL OVER

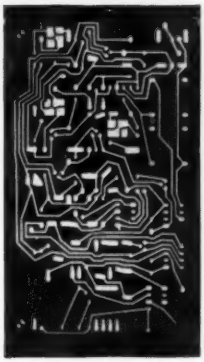

PLATE COPPER ON PRINTED
CIRCUITS, PLASTICS, CERAMICS, METALS

COMPLETE 'ENPLATE' PROCESSES AVAILABLE FOR PLATING ON MORE THAN 50 MATERIALS—FROM ALUMINUM TO VINYL

Plastics, printed circuits, rubber, glass, ceramics, ferrites, other non-conductors and semi-conductors, metals. These are among more than 50 materials you can now plate efficiently at low cost with Enthone's new line of 'Enplate' electroless nickel, copper and silver plating products and processes.

For example, 'Enplate' Ni-410 deposits a hard, wear-resistant, nickel-phosphorous coating of uniform thickness on the most complex parts. Corrosion resistance is better than electroplated nickel. Brass housing illustrated above has same thickness of 'Enplate' nickel in blind holes and screw threads as on outer surfaces and edges. 'Enplate' CU-400 is excellent for rapid application of a thin film of copper on non-conductor surfaces. Plastic surfaces, such as thru-holes in printed circuit board shown, can be made conductive for subsquent electro-plating.

'Enplate' chemical plating baths are highly purified, ready-to-use liquid concentrates. Just add to water to make instantly usable chemical plating solutions. For guidance on your best chemical plating cycle and on proper cleaning and activation procedures, write today for your copy of the new 'Enplate' brochure. Enthone Incorporated, 442 Elm Street, New Haven 8, Conn.

ANOTHER PRODUCT OF Enthone RESEARCH

ENTHONE *A Subsidiary of American Smelting and Refining Company* ASARCO

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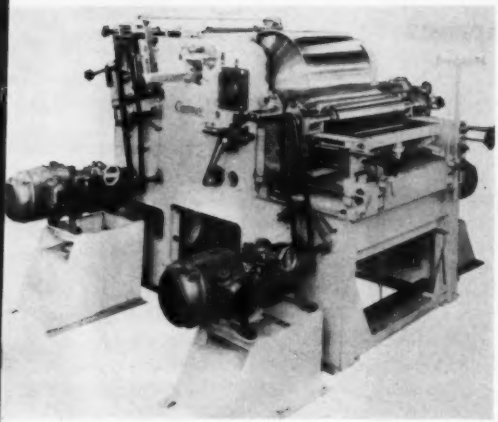
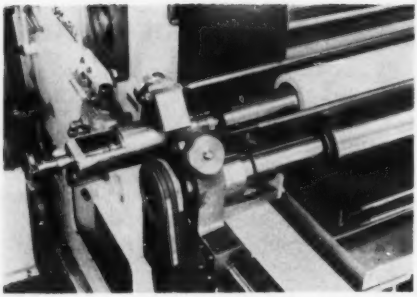


Gasway coater has independent power sources for coating and doctor rolls. Machine also has independent power sources for coating the two sides of the strip. This arrangement provides variability of adjustment and freedom from vibration.



Closeup shows doctor and coating rolls which are precision ground on centers and also mounted on centers in the machine. This maintains concentricity, improves control of coating thickness.

brings the center back up tight to the roll and locks it in, maintaining perfect concentricity.

A further design incorporated into the machine to maintain precision control of the paint film is the conical-headed construction of the large back-up rolls. This conical head replaces the flat head formerly used and provides a highly rigid roll not subject to deflection under the high tension of the strip against it. This helps maintain a constant film contact along the coating roll and also tends to eliminate irregularities caused by the "oil-can" wavy imperfections sometimes found in even the highest quality mill stock.

Manufacturer: Gasway Corporation, 6403 N. Ravenswood, Chicago 26, Ill.

For more data circle **2** on Postpaid Card

★ ★ ★

Filter for Airless-Spray-Painting Units

Binks Manufacturing Company has developed an inline paint filter for use with airless-spray-painting units.

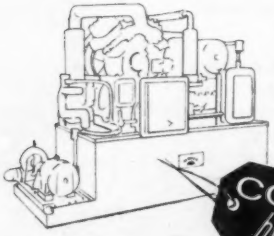
The filter has an anti-clogging feature and large filtering area that provide from 8 to 16 hours spraying time

(continued)

MF/301 A

For Anodizing (Regular and Hard Coat) and Plating Processes . . . You Need the

New MAYER PACKAGED ACID CHILLER



Results are guaranteed when products and processes are

COOLED by MAYER

SPECIALISTS . . . IN INDUSTRIAL COOLING

For Over 90 Years

Bulletins on Request

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Get brilliant, blue-white zinc plating—without bright dipping!

Du Pont "Zin-O-Lyte"* brighteners give you superior cyanide zinc plating . . . with no bright dipping required. You get brilliant blue-white, rust-resistant deposits directly from the plating bath over a wide range of current densities. Extra rinse and bright dip tanks aren't needed . . . an important space-saving feature.

Two "Zin-O-Lyte" brighteners are available:

- "Zin-O-Lyte"—widely used powder form. Available in two formulations, one for barrel plating and one for still plating.
- "Zin-O-Lyte" Special—a low-cost formulation designed for barrel plating.

For additional information on these products and demonstrations of "Zin-O-Lyte" quality and performance, contact your Du Pont distributor or nearest District Office. Du Pont Electrochemicals Department, Wilmington 98, Delaware.

DU PONT ZIN-O-LYTE®

zinc plating chemicals

*Reg. trademark for DU PONT zinc plating chemicals.

ATLANTA • TR 5-5391	BOSTON • TW 9-8300	CHARLOTTE • 375-5561
CHICAGO • IN 3-7250	CINCINNATI • PA 1-5253	CLEVELAND • LO 1-1580
DALLAS • ME 1-4140	DETROIT • UN 4-1963	LOS ANGELES • CU 3-2761
NEW YORK • LO 3-6440	PHILA. • TR 8-2700	SAN FRANCISCO • JU 6-5141

DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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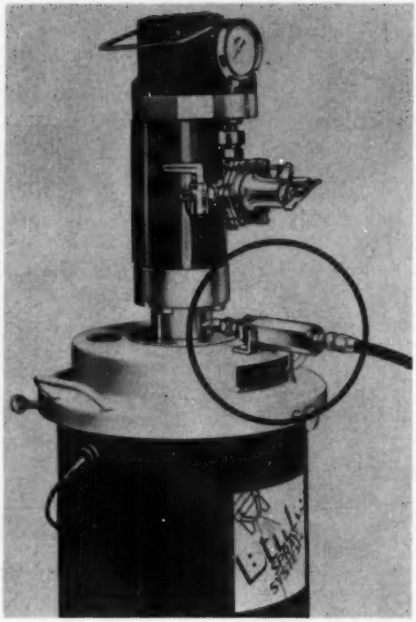
at filtering rates up to 32 oz./min., before cleaning is required.

Filtering area is 3.14 square inches, and the unit provides a zero pressure drop across the element with only 5 per cent of the filtering area open.

In operation, fluid passes through wedge-type openings. Particles too large to pass through the openings are washed away from the filter surface. Thus no fluid can cake on the filter element and later flake away to plug the spray gun nozzle.

The design also eliminates nozzle plug-ups which occur from flake-out in long hoses.

Normally the filter unit is installed in the material hose adjacent to the airless pump unit. When desired, however, the unit may be attached directly to the Binks Model 39 hand spray gun, Model 41 automatic gun, or Model 42 airless pole gun, by reversing the fittings. This is an advantage when the operator is working at some distance from the airless unit.



Inline paint filter designed by Binks Manufacturing Company for use with airless spray painting units is circled. It's mounted on Binks airless painting unit.

The filter element is permanent, and is easily removable for cleaning. Any standard cleaning solvent can be used.

Manufacturer: Binks Manufacturing Co., 3118-40 Carroll Ave., Chicago 12, Illinois.

For more data circle **3** on Postpaid Card

★ ★ ★

Easily Serviced Roof Ventilator

The entire motor and fan housing flips back 90 degrees on this powered roof ventilator, simplifying servicing.

(continued on page 126)

TITANIUM

PLATING BARREL CLAMP

Fits popular make 14″ cylinder

$14.00 each, from stock

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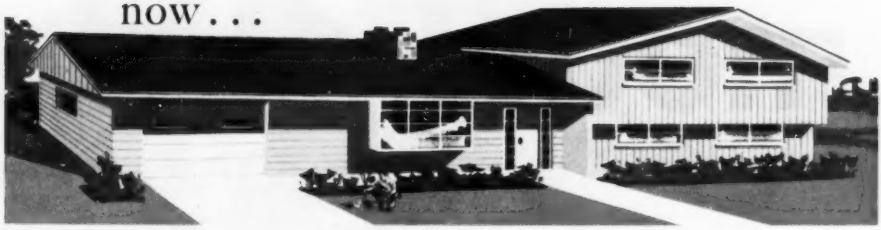
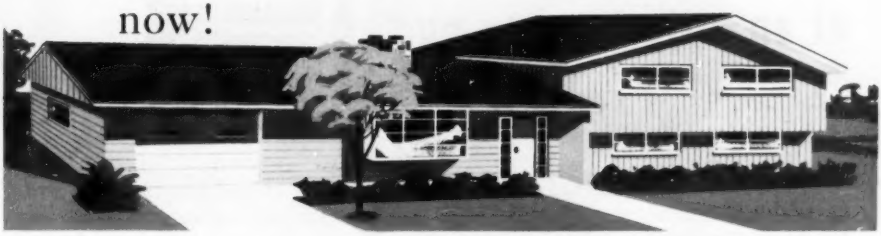
now . . .



make sure it will look as well
5 years
from
now!



Bonderite* protects the beauty of painted metal

Big selling point of metal siding, shingles, windows, doors and other metal building products is permanence and lasting beauty. To assure that permanence – to protect customer satisfaction and your products' reputation – use Bonderite coatings to anchor the paint finish.

Your paint over Bonderite-treated aluminum, steel or galvanized stays tight and bright and beautiful through years of weather.

And now every manufacturer of formed, painted metal products can have the benefits of Bonderite, even without a Bonderizing* installation in the plant. Bonderized* and painted metal, in coils and sheets, is available from firms specializing in quality finishing. You form your products from the finished stock.

Want more detailed information? See your Parker representative or write: Parker Rust Proof Company, 2172 E. Milwaukee, Detroit 11, Michigan.

*Reg. U.S. Pat. Off.

PARKER

FIRST IN SURFACE TREATMENTS FOR METALS SINCE 1914

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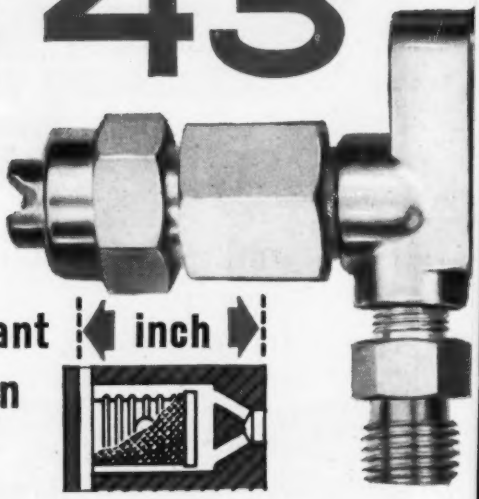
Another NEW from Binks

model 43



FEATURING

... the most important inch of an airless spray gun

NEW removable metal screen cartridge keeps nozzles clear longer by trapping foreign particles before they reach and clog the nozzle.

NEW diffuser nut makes nozzle tip changing completely safe. The nut diverts the fluid on an angle to the side walls of a chamber taming velocity and impact of the fluid stream to a harmless level.

NEW positive trigger lock reduces operator fatigue by locking the trigger in place for continuous spraying; a squeeze on the trigger unlocks it.

PLUS all standard quality features users expect with Binks spray painting equipment. Put the Model 43 to work in your operation . . . it can be used with any airless spray painting unit.

CALL OR WRITE TODAY for all the facts. Ask for Bulletin A52-7. Your Binks Representative is as close as your telephone. Ask about the free spray painting school, too. Open to all. No tuition. Binks Manufacturing Company, 3122 Carroll Avenue, Chicago 12, Ill.

1479 REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES · SEE YOUR CLASSIFIED DIRECTORY

Binks Everything for spray painting

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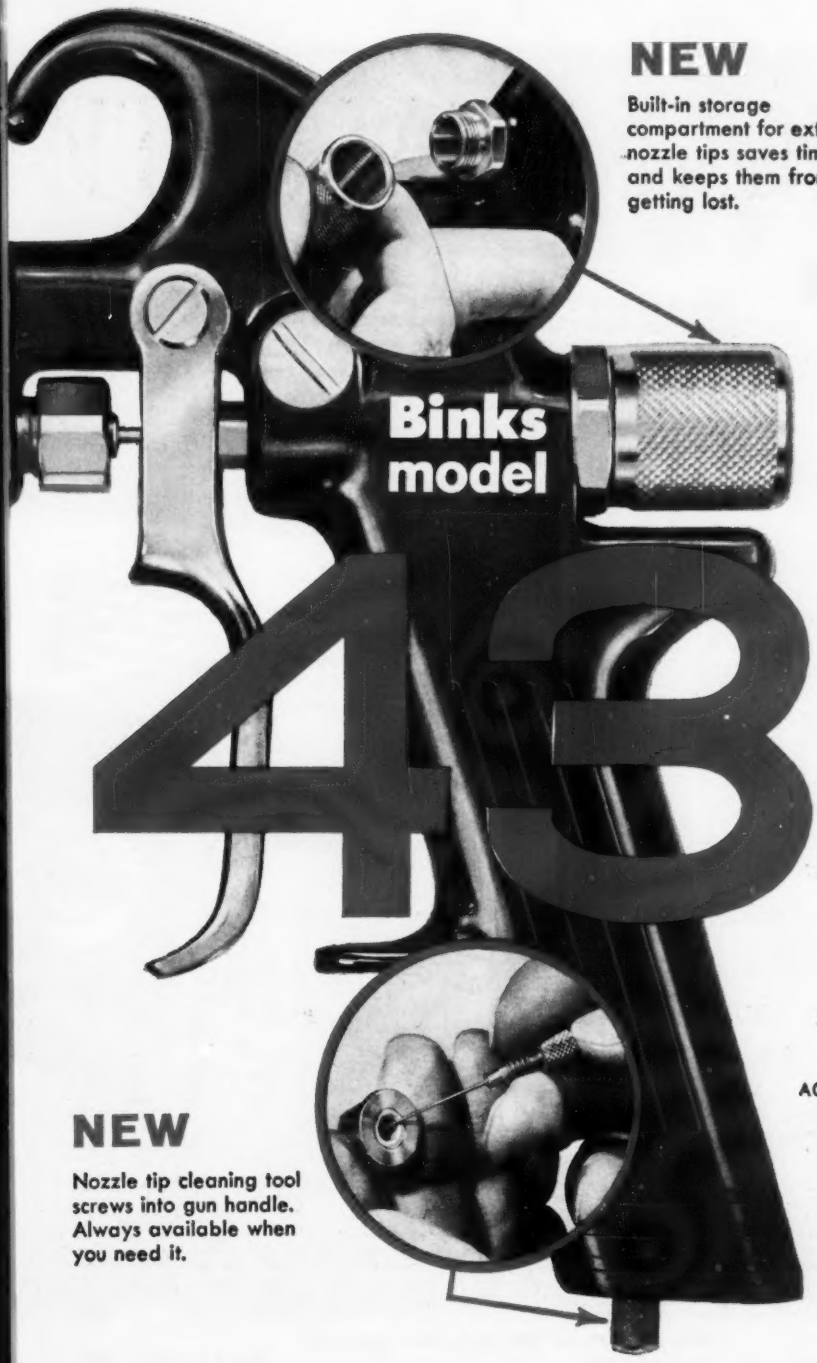

NEW

Built-in storage compartment for extra nozzle tips saves time and keeps them from getting lost.

ACTUAL SIZE

NEW

Nozzle tip cleaning tool screws into gun handle. Always available when you need it.

Platers: EVALUATE

Harshaw customer or not, you are benefiting now from our broad investigations into better plating materials and processes. This work started 62 years ago, and continues today with greater emphasis than ever.

FIVE plating laboratories provide analytical and testing service for our customers. These and technical staffs at Harshaw's nine branches are backed up by the spectrographic, metallographic, research, development, and testing laboratories in Cleveland. There is a Harshaw laboratory and sales branch near you, ready to serve.

Addition agents, anodes and chemicals are stocked in nine branch warehouses in U.S.A., and in Canada, England, Holland, France, Germany, Italy, Switzerland, Australia, Japan,

Harshaw has faithfully served the plating industry for more than 60 years

Write for our literature on Harshaw's processes, anodes, and chemicals.

HARSHAW

ELECTROPLATING

★ *PROCESSES*
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THE HARSHAW CHEMICAL COMPANY

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YOUR SUPPLIER

Are You Getting What Harshaw Offers?

and other countries. Standardizing on Harshaw processes makes these same high quality processes available to your foreign facilities.

Harshaw processes give the Plater what he wants — the leveling, the corrosion resistance, the beauty . . . the simple operation, the economy. The millions of gallons now in operation testify to this. As your changing requirements demand new and better plating materials, look to the leader! Harshaw research will find them. Harshaw know-how will make them. Harshaw service will deliver them to you.

HARSHAW

Plating Processes also available through the following Foreign Distributors or Manufacturers:

HARSHAW CHEMICALS LTD., LONDON, ENGLAND
HARSHAW VAN DER HOORN, N.V. UTRECHT, HOLLAND
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And many Agents throughout the world

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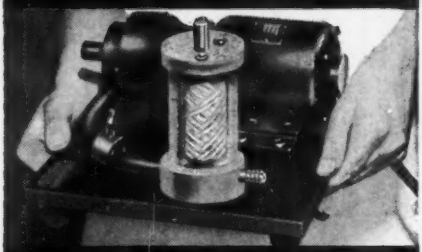
miniature 10 and 25 g.p.h. FILTER SYSTEMS



for laboratories, pilot plants and small batch process industries

filters and circulates sensitive corrosive precious solutions-solvents

Model LAI-1 up to 10 g.p.h. **$98** **Model LAI-3** up to 25 g.p.h. **$125**

features:

- Needs only 8" x 9" bench space
- Lucite (140°F. max.) or pyrex-epoxy (250°F. max.) chambers, also teflon, etc.
- Dynel, porous stone or porous carbon filter tubes
- Leakproof epoxy centrifugal pump
- Self-primer available
- Continuous duty ball bearing motor

FREE BULLETIN

Send for your Sethco Bulletin 602 for complete technical data on LAI portable filter systems today.

Sethco MANUFACTURING CORP.

2292 Babylon Turnpike, Merrick, N. Y. MA 3-4220

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New Products . . .

DeBothezat "Flip-Top" Roof Ventilator

The DeBothezat "flip-top" Power-Flow roof ventilator is available with fan wheels from 12 to 48 inches in diameter, capacities up to 43,070 c.f.m.

A vertical-discharge model exhausts air at high velocity, dispersing contaminants high enough to prevent their re-entry into the building's air supply.

Manufacturer: DeBothezat Fans Div., American Machine and Metals, Inc., Dept. FT-R, East Moline, Ill.

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★ ★ ★

Film Protects Polished Metal Surfaces

A plastic protective film called "Metal Skin" is rolled onto the surface of highly polished metal to protect the finish during forming, bending, drawing and stamping. The clear film is not attached to the metal by an adhesive, thus there is no problem of adhesive transfer.

Fully transparent, Metal Skin permits continuous inspection through every step of production and shipping, helps prevent costly fabricated rejects.

(continued)

Sethco
Now, HIGH TEMPERATURE TO 250° F.
SUBBA-5, -10 and -20
SUBMERGED FILTER SYSTEMS
with totally enclosed, ball-bearing, continuous duty, fan-cooled, 3400 r.p.m., 1/4-1/3 h.p., brushless AC motor.
SUBBA-5 price, includes 1/4 h.p., AC motor, Stainless Steel Mounting Brackets and Hose
$215
Model SUBBA-5
ONE YEAR GUARANTEE
FOR COMPLETE SPECIFICATIONS SEND FOR DATA SHEET 551B
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DEPTH FILTRATION FOR ALL ELECTROPLATING AND INDUSTRIAL APPLICATIONS • METAL FINISHING • PHOTO PROCESSING • PETROLEUM • SOLVENTS • LACQUERS • PHARMACEUTICALS • ULTRASONIC CLEANERS • RADIOACTIVE SOLUTIONS • WATER • ELECTROTYPING

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The plastic film is easily removed, peels off quickly and easily in one piece with no chemicals or solvents needed. It can be removed at any time or left on to be removed by the ultimate consumer.

Application can be made at the time of slitting and coiling and simultaneously with fabrication where the coiled stock is fed into a sheeter or stamping machine.

Manufacturer: Metal Skin Corp., No. 3, Tenafly Rd., Englewood, N. J.
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★ ★ ★

Electric Immersion Heaters for Storage Tanks

Automatic heaters for storage tanks are assembled complete with a tank adapter box and weatherproof control panel consisting of circuit breaker, contactors, selector switches, control relay, over-temperature control and two-step indicating thermostat. The heating elements are inserted in seamless steel pipes. The all-welded assemblies are pre-wired and delivered ready for immediate installation.

The heaters are installed through a rectangular hole cut in one end of the tank. Internal supports for the heater pipes on 10-foot centers must be provided on the tank floor. The tank adapter box is welded to the wall of the tank.

Manufacturer: Radcor, Inc., P. O. Box 432, Fostoria, Ohio.
For more data circle **6** on Postpaid Card

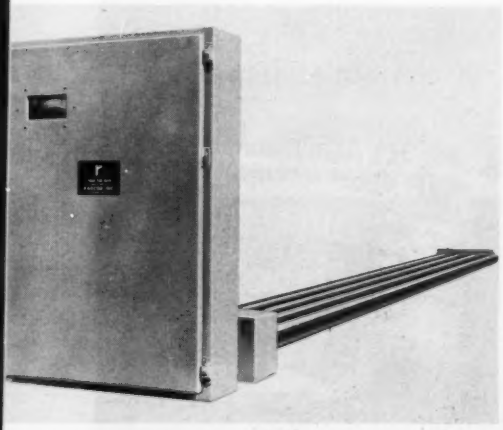
★ ★ ★

Compact Drum-Type Washer Cleans Small Parts

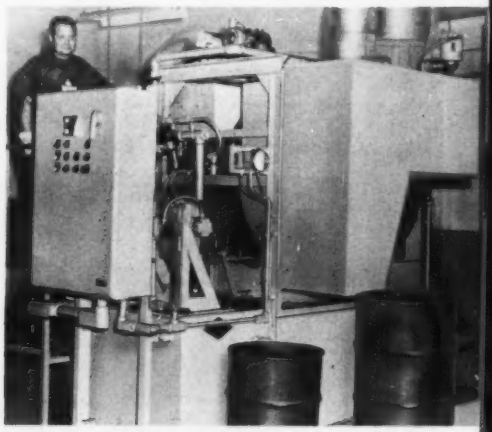
Alvey-Ferguson Co. recently introduced a batch-type washer with a capacity of 3 cubic feet. It can be operated by one man.

Originally designed to clean new and reclaimed starter-drive components, the machine is now being used for cleaning a wide variety of small parts.

Parts to be cleaned enter the drum through a chute and are subjected to a high-pressure spray. During the washing cycle, the parts are gently tumbled by the helical spiral in the



Radcor's Storage-Tank Immersion Heater



Alvey-Ferguson Drum-Type Batch Washer

drum so that all surfaces are exposed to the cleaning solution. All oil, chips, impurities and cleaning solutions are drained off through perforations in the drum. A rinse is followed by drying. The entire sequence is controlled by an automatic timer. The drum unloads automatically.

Manufacturer: The Alvey-Ferguson Co., 3131 Disney St., Cincinnati 9, Ohio.

For more data circle **7** on Postpaid Card

★ ★ ★

Automatically Sprays Welded Seams on Five-Gallon Pails

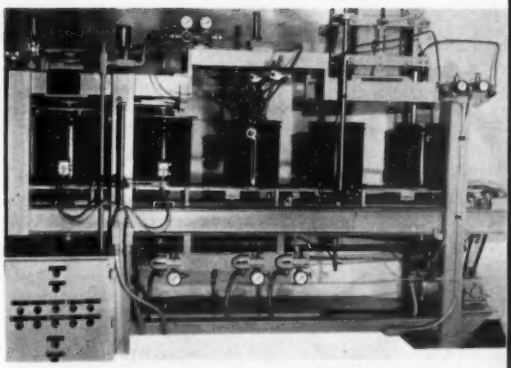
When flat sheets of steel are coated by rolling or lithographing and then rolled and welded to form a pail, welding requirements make it necessary to leave two uncoated edges which later become the vertical seam of the pail. It is also necessary to leave uncoated areas where lugs are spot welded to carry the pail handles.

Spraymation Model P60 automatic pail touch-up unit receives the pails indiscriminately from a previous operation. As the pails enter the conveyor of this unit, they are scanned by photo-electric and resistance-sensitive probes to determine the position of the seams and lugs.

At two stations the pails are elevated from the conveyor and rotated so that all seams and lugs are placed in the same relative position. At later stations, fixed spray guns apply paint to the inside and outside lug areas.

At two subsequent stations, a vertical reciprocating gun traverses the seam for its full length, coating the unpainted areas. The pail is then ejected for inspection and shipping.

The machine is fully automatic and operates at production rates of 1500 pails per hour, handling various colors and designs with a minimum of attention. It is completely self-powered and can easily be installed in an existing line. A similar unit is available for larger pails and 55-gallon drums.



Automatic Painter for Pail Seams

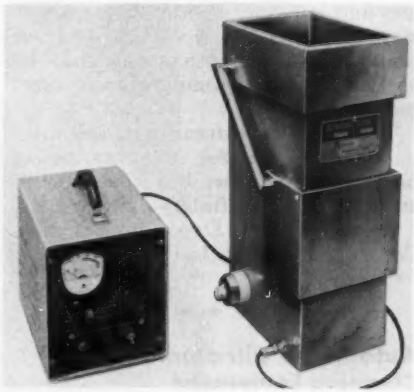
Manufacturer: Spraymation, Inc., 25 Amity St., Little Falls, N. J.

For more data circle **8** on Postpaid Card

★ ★ ★

Ultrasonic Degreaser for Freon Solvent

A two-stage ultrasonic degreaser specifically designed for use with DuPont Freon TF solvent is especially useful in cleaning metal parts with plastic inserts or insulation that would ordinarily be attacked by trichlorethylene.



Degreaser Designed for Freon Solvent

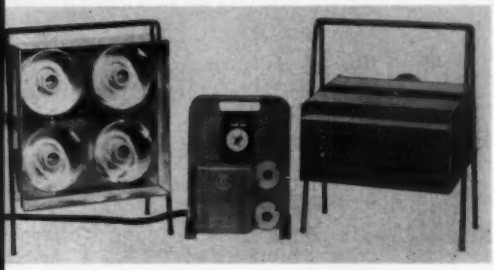
Manufacturer: National Ultrasonic Corp., 95 Park Ave., Nutley 10, N. J.

For more data circle **9** on Postpaid Card

New Products . . .

Portable Testing Oven

A portable electric infrared testing oven introduced by the driQuik Division of Dry Clime Lamp Corp. is designed for laboratory and field baking of organic coatings. It consists of two radiant panels and one control



Dry Clime's Portable Testing Oven

panel. Each heating panel has high-wattage ceramic-type infrared generators and is mounted on a frame which may be pivoted from vertical to horizontal. Either or both panels may be plugged into the temperature-control assembly.

The portable radiant oven was originally designed for laboratories of paint manufacturers, but it has proven useful for testing finishes in the field.

Manufacturer: Dry Clime Lamp Corp., Greensburg, Indiana.

For more data circle **10** on Postpaid Card

★ ★ ★

Automated Ultrasonic Cleaning Equipment

Cleaning equipment that automatically takes parts through various cleaning, ultrasonic cleaning, rinsing and drying stages has been introduced by AutoSonics, Inc. Westinghouse ultrasonic generators and transducers supply the ultrasonic action.

Various models are available, including one that takes parts through on a series of rotating wheels; one that carries tote boxes through on a cleated conveyor belt; and portable machines that require no piping, no special ventilation.

All AutoSonex machines have an exclusive (patent pending) solvent-control system which cuts down on solvent consumption.

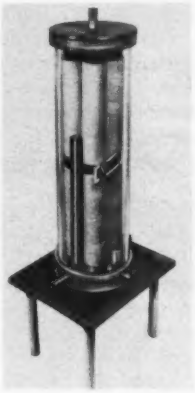
Manufacturer: AutoSonics, Inc., 4217 Chestnut St., Philadelphia 4, Pa.

For more data circle **11** on Postpaid Card

★ ★ ★

Full-View Filters: Increased Capacity

Sethco Mfg. Corp. has increased the capacity of its "full-view" filters. Model L-80 (illustrated) has a capacity of 800-1200 g.p.h. These units have clear lucite chambers which permit the operator to see what's happening inside the filter. In addition, all parts are of materials which resist corrosives.



Full-View Filter

Chambers in this series have a threaded stainless steel rod through the center for mounting and quick disassembly.

Manufacturer: Sethco Mfg. Corp., 2284 Babylon Turnpike, Merrick, L. I., N. Y.

For more data circle **12** on Postpaid Card

★ ★ ★

Corrosion-Test Cabinets Have Improved Fog Generator

Singleton "Opti-mist" corrosion test cabinets now have a moveable fog

(continued)

STONE AGE or JET AGE

how does your chrome plating stack up?

You can keep your chrome-plating process in step with today — with Diamond CPA 1800®.

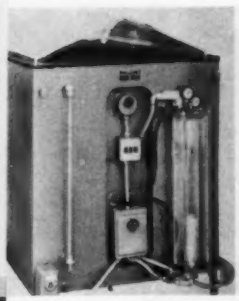
For example: The CPA 1800 process is now being used in advanced jet engine experimentation — meeting the severest tests for corrosion and abrasion-resistance tolerances ever imposed on high-pressure seals.

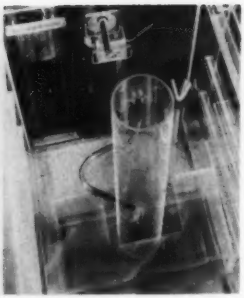
This same jet-proven additive is available to you and to your chrome-plate source. To increase plating speed and covering power. To allow a broader operating range. To simplify anoding and produce a brighter, harder coating. To improve the metallurgical characteristics of chromium plate.

In short: Diamond CPA 1800 can cut your unit costs and save you money. Diamond developed it. Your Diamond CPA 1800 Distributor can supply it where and when you need it. For further information write or call Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.

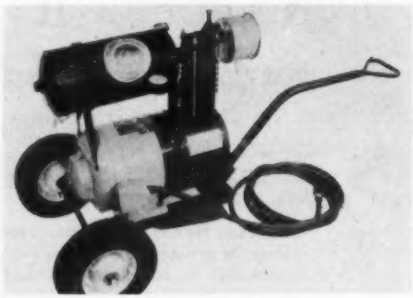
Diamond Chemicals

For more data circle 395 on Postpaid Card





Singleton test cabinet (left) with "Opti-Mist" fog generator and solution reservoir



Eclipse 555-80 Airless Sprayer: a portable that operates on 110-volt house current

generator-solution reservoir. This is said to be the first such accessory to successfully create uniform, free-settling fog for proper collection to meet official requirements. The generator tube stands upright in a reservoir which water-seals the bottom against fog recirculation and other causes of variables. Solution and cabinet temperatures are constant. Adapts to old and new cabinets.

As an alternate to the generator, a 3-dimensional fog baffle, adjustable for directing fog as desired, is attached to reservoir cover.

Manufacturer: The Singleton Co., 11770 Berea Rd., Cleveland 11, Ohio.

For more data circle **13** on Postpaid Card

★ ★ ★

Portable Compressor for "Airless" Painting

The Eclipse 555-80 compressor will operate an airless painting pump at commercial speed using ordinary 110-volt house current.

Designed for compactness and portability, this ¾-h.p. compressor measures 22 inches long by 14 inches wide by 24 inches high. An integral unloader is built in the cylinder head so that the compressor runs only when actually needed.

Other features include storage and pulsation chamber with drain cock, 15 feet of rubber covered cable, and large intake muffler and filter.

Manufacturer: Eclipse Air Brush Company, 390 Park Ave., Newark 2, New Jersey.

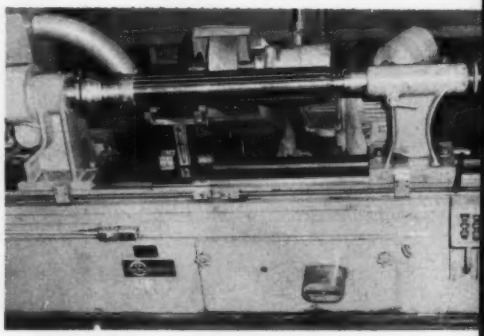
For more data circle **14** on Postpaid Card

★ ★ ★

Versatile Automatic Polishing Machine Finishes Parts of Various Sizes

An automatic polishing machine built by Acme Manufacturing Company smooths piston rods, hydraulic cylinder tubes and scraper hoist pis-

(continued)



Finishing hydraulic cylinder tube on an Acme polishing machine built for the job.

Michner saves a lot of money and a lot of hard work with UNIVERTICAL Nickel Ball Anodes in Titanium Ball Anode Containers

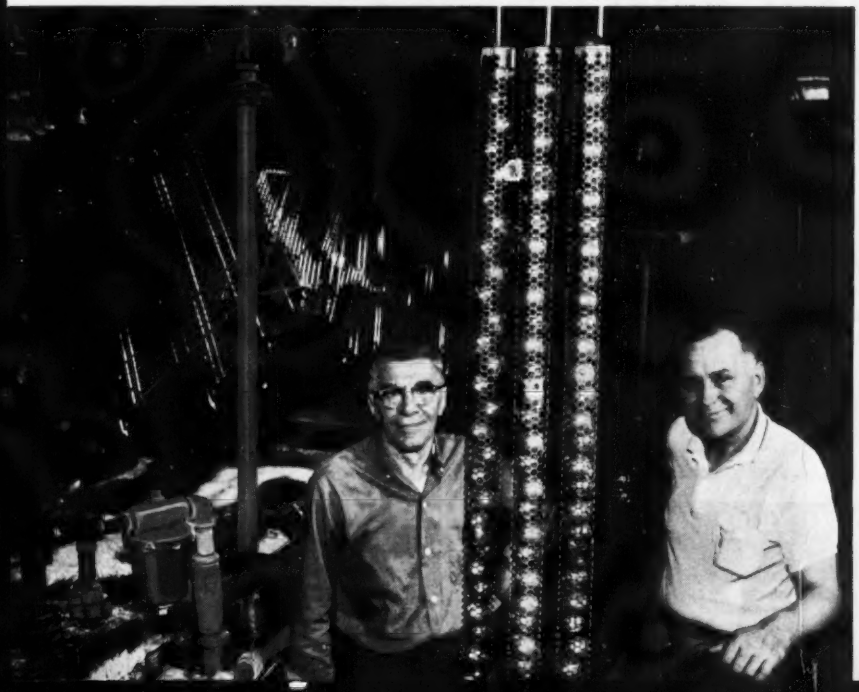
Reports JOE MICHNER,
Owner of the MICHNER PLATING COMPANY,
Jackson, Michigan

Joe Michner is a plater with 42 years of experience. He and Malcolm Smith, Plant Superintendent, inspect Univertical titanium containers loaded with Univertical nickel ball anodes before they enter the automatic plating machine.

Titanium containers have been used continuously for more than two years in nickel and copper plating by one of the largest automotive bumper plants. The ability to maintain constant anode area enhances controlled quality plate and reduces greatly the possibility of plating out nickel from metal salts. There is no scrap problem, remelt or replacement. "Fringe benefits" include reduction of downtime for replacement of anodes and the fact that floating anode bags and bags cut by anode spears are eliminated.

Results like these are common with Univertical nickel ball anodes. Ask Univertical for full details.

UNIVERTICAL CORPORATION, 14841 Meyers Rd., BRoadway 3-2000, Detroit 27, Michigan
For more data circle 396 on Postpaid Card



UNIVERTICAL CORPORATION

tons to a 10-16 microinch finish at Euclid Division of General Motors Corporation, Cleveland, Ohio.

The parts finished vary from 40 to 380 pounds in weight, 16 to 46 inches in length, and 1¾ to 8 inches in diameter. Alloys range from 1018 steel tubing to 4140 heat-treated steel forgings.

Prior to the installation of the Acme machine, the rods, pistons and tubes were semi-finished on a lathe and finished on an external grinder.

The Acme machine is an integral unit and is designed to belt grind, polish, or buff cylindrical parts up to 32 inches in diameter and 72 inches long to a 2-microinch surface finish.

A standard motorized buffing lathe with belt arm attachment is connected to the base of the machine. Thus abrasive belts, abrasive wheels, and buffing wheels can be used.

A head-and-tail-stock assembly with variable-speed spindle drive is mounted on a reciprocating work table. The speed of the reciprocating work table is also variable. The head stock, tail stock and buffing or polishing head are adjustable for different lengths and diameters. A timer controls the number of buffing or polishing passes.

At Euclid, rods, tubes or piston parts are mounted between the head and tail stock. The polishing head is adjusted to contact the periphery of the part. The adjustable stops and cycle timer are set for the specific polishing application. When the start button is pressed, the machine automatically reciprocates the rotating part past the finishing member to achieve the required surface finish. At the end of the finishing cycle the machine automatically stops.

Manufacturer: Acme Manufacturing Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

For more data circle 15 on Postpaid Card

★ ★ ★

Single-Component Polyurethane Finish

A one-package polyurethane coating that is said to combine the advantages of two-component polyurethanes with the convenience of ready-to-use products has been developed by Hughson Chemical Co.

The recently introduced product is available in formulations that are hard or flexible and in any color.

Known as Chemglaze coatings, these finishes are true oil-free polyurethanes. They cure at room temperature or by baking, have excellent resistance to abrasion, impact, chemicals and solvents. Shelf life is one year or more. Application is by brush, spray, roller coating or dip.

Chemglaze coatings may be used on flexible or rigid surfaces. Suggested

TRUE BRITE BRASS SOLUTION

A foolproof solution which has been in use for over 6 years in light and heavy production.

- Ready To Use—Just Add Water
- No Variance in Color
- Trouble-Free—Little Supervision Needed
- Low Cost—Additions only once a day

Available in a variety of colors. Will match your sample.

Write for technical bulletin and prices.

TRUE BRITE CHEMICAL PRODUCTS CO.
Box 31, Oakville, Conn.

For more data circle 397 on Postpaid Card

Unretouched photo shows Chemglaze's resistance to impact and abrasion. Pin on right needs refinishing after 800 lines service. Pin on left, finished with Chemglaze, retains its appearance after 2132 lines.

applications include finishing plastics, fabrics, leather, heavy-duty floor areas, sporting goods, refinery and chemical-process equipment, tank cars and trucks, and for marking streets.

Manufacturer: Commercial Development Dept., Hughson Chemical Co., Erie, Pa.

For more data circle **16** on Postpaid Card

★ ★ ★

Buffing-Compound Remover

Buf-Comp is a combination of liquid detergents and penetrants which is said to be especially effective in removing buffing compounds from parts after buffing operations. Used at 160 to 212 deg. F. in a water solution, it removes compound from parts in a 2-8 minute immersion.

Manufacturer: Mitchell-Bradford Chemical Co., Wampus Lane, Milford, Conn.

For more data circle **17** on Postpaid Card

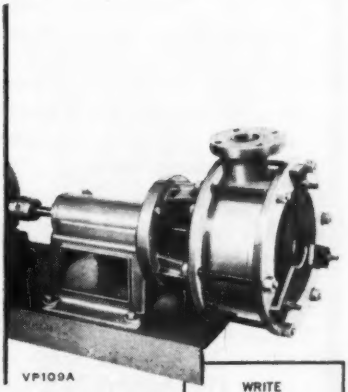
Corrosion Resistant Centrifugal Pumps in PVC and Polypropylene

To Handle HCL, H_2SO_4, Most Acids Plating Solutions and Many Solvents

Wetted parts are constructed of unplasticized, unmodified polyvinyl chloride or Polypropylene. These pumps offer the widest possible range of corrosive resistance, as well as the non-contaminating transfer of sensitive solutions.

A complete line. Vanton Centrifugal pumps are available with capacities 10 through 180 GPM, discharge heads to 160 feet. They cost less and last longer than many special alloy pumps used in similar service applications.

Ruggedly constructed, engineered for efficiency, they have mechanical shaft seals of the latest design in a range of materials to cover all corrosive applications.



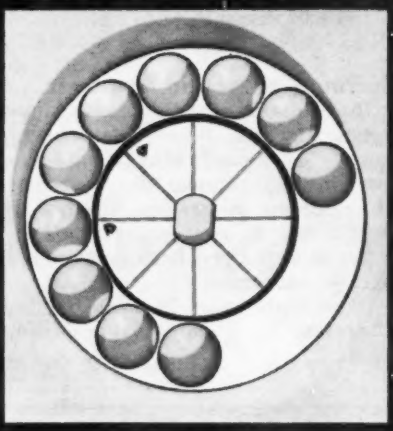
WRITE FOR SPECIFICATIONS INFORMATION

VANTON PUMP & EQUIPMENT CORP.
DIVISION OF
COOPER ALLOY CORPORATION · HILLSIDE, NEW JERSEY

For more data circle 398 on Postpaid Card

■ **The Part:**

AUTOMATIC ELECTRIC DIVISION'S TELEPHONE DIALS



The Problem:

■ To cut and color buff prior to chrome plate at minimum production speeds of 700 finished dials per hour . . . potential capability of 1,000 dials per hour to be available to meet future needs . . . finish to be free of imperfections despite irregular surface and thin edges . . . fixturing to be simple and maintenance-free.

Automatic Electric Put The Job On A Packer-Matic

For The Process see opposite page.

THE PACKER MACHINE COMPANY

456 Center Street

Meriden, Connecticut

For more data circle 399 on Postpaid Card

Paint Pump

Addition of a 1.5-to-1 ratio paint pump to its line of fluid-handling equipment has been announced by The DeVilbiss Company. For transfer pumping, it will empty a 55-gallon drum in 6 minutes.

Models are available for use with 55-gallon drums, small paint-circulating systems, 5-gallon pails, and for use in handling corrosive liquids.

Manufacturer: DeVilbiss Co., Toledo, Ohio.

For more data circle 18 on Postpaid Card

★ ★ ★

Emulsion Cleaner Removes Buffing Compound

An emulsion cleaner designed to remove hard, impacted buffing compounds from all types of basis metals has been developed by MacDermid Inc.

Called Metex Emulsion Cleaner M-624, the product may be used in concentrations as low as 5 per cent for maximum economy. Concentration may be varied to suit conditions, with 5 per cent giving a normal emulsion and above 20 per cent an invert emulsion.

Because M-624 emulsifies readily, it is removed easily to prevent contamination of other solutions.

M-624 may be used in steel soak tanks or incorporated in washing machine cycles.

Manufacturer: MacDermid Inc., Waterbury 20, Conn.

For more data circle 19 on Postpaid Card

★ ★ ★

Clothing Resists Sulfuric Acid

Clothing made from a fabric which will resist sulfuric acid at concentrations up to 94 per cent without loss of tenacity has been introduced by Worklon, Inc.

The polypropylene fabric also has excellent resistance to caustics.

Strong and lightweight, the fabric

Worklon polypropylene work clothing resists 94 per cent sulfuric acid

dries quickly and offers wearing comfort and good shape retention.

Manufacturer: Worklon, Inc., 253 W. 28th St., New York 1, N. Y.

For more data circle **20** on Postpaid Card

★ ★ ★

Economy-Model Ultrasonic Cleaning Unit

A low-priced five-gallon ultrasonic cleaner features broad-band frequency modulation, which is said to eliminate need for automatic tuning and at the same time prevent overloading of transducers.

The cleaner's generator is rated at 320 watts average power, 1280 watts peak power input. The unit is said to be as simple to operate as a radio.

Manufacturer: Ultrasonic Industries, Inc., Ames Ct., Engineers Hill, Plainview, L. I., N. Y.

For more data circle **21** on Postpaid Card

Anti-Staining Pearl Pigment

Synthetic Pearl Pigment Series 320 features low degree of sulfide staining, excellent heat stability, luster and brilliance.

It is available in vehicles suitable for dispersion in vinyl coatings. Samples are available from the manufacturer at no charge.

Manufacturer: Rona Pearl Corporation, East 21st St. and East 22nd St., Bayonne, N. J.

For more data circle **22** on Postpaid Card

★ ★ ★

Miniature Agitator Aids in Spraying Metallics

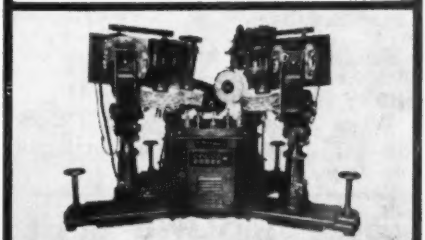
The Mini-Mix miniature agitator is now available in a syphon-jar unit, designed for spraying small quantities of materials where it is important that constant agitation be maintained to prevent settling of pigments or metallic contents.

First designed for the paint labora-

(continued)

■ **The Process:**

Cut and Color Buff On A Model 4-5 Packer-Matic

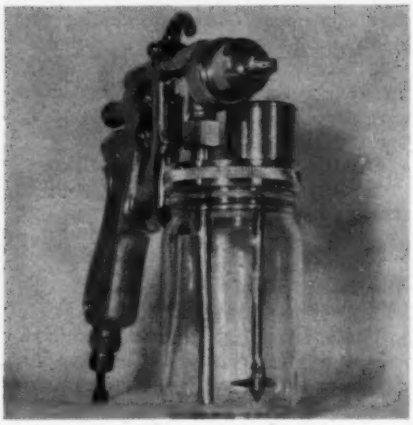


■ An indexing type rotary machine, the Model 4-5 Packer-Matic incorporates 5 rotating spindles on the work table. Four belt-driven heads handle tampico, sisal, wire wheels or cotton buffs. (Automatic Electric uses 2 abrasive belt heads and 2 buffing heads.) Production range can be varied from 350 to 1,050 parts per hour. (Easily satisfying Automatic Electric's immediate and future requirements.) Heads can be set at any angle from horizontal to vertical (solving the problem of Automatic Electric's irregular dial surfaces.)

Bring Your Finishing Problems To Packer. Begin By Writing Today For Latest Descriptive Literature.

THE PACKER MACHINE COMPANY
456 Center Street, Meriden, Connecticut

For more data circle 400 on Postpaid Card



Spraymation Miniature Agitator for syphon jar

tory to aid color control work on acrylic and metallic finishes, it is now being used in the electronics industry for the agitation of ceramic and metallic materials used in the manufacture of cathodes and transistors.

Manufacturer: Spraymation, Inc., 25 Amity St., Little Falls, N. J.
For more data circle **23** on Postpaid Card

★ ★ ★

Epoxy Floor Surfacer

When applied ⅛ to ¼ inch thick, No. 6713 Epoxy Surfacing Compound is said to equal the strength of up to two inches of concrete. It can be feather-edged, is suitable for patching or overlaying of concrete, wooden, or steel floors, surfacing walls, and lining the inside of tanks. Providing an alcohol, acid and abrasion-resistant surface, No. 6713 is useful for maintenance and repair of factory floors, roadways, reservoirs, culverts, airport runways, bridges, silos, and chemical tanks.

Manufacturer: Dennis Chemical Co., 2701 Papin St., St. Louis 3, Mo.
For more data circle **24** on Postpaid Card

★ ★ ★

Plastic Coatings Preserve Highly Polished Metal Surfaces

Washguards are applied by spray, roller coating or dip to protect surfaces

Washguard: keeps surface shiny during forming

of metals during fabrication. The plastic coatings are easily removed after manufacture by means of water, alkaline wash or solvent cleaning, depending upon the type of Washguard used.

The temporary coatings are now in

(continued)

Cut TUMBLING Costs
With Ti-Co
COB MEAL
A Grade for Every Application
Drying — Polishing
Deburring — Finishing
TI-CO INDUSTRIES, INC.
P. O. BOX 185 • TIPTON, INDIANA
Phone or Telegraph: FEderal 2-5942, Elwood, Indiana
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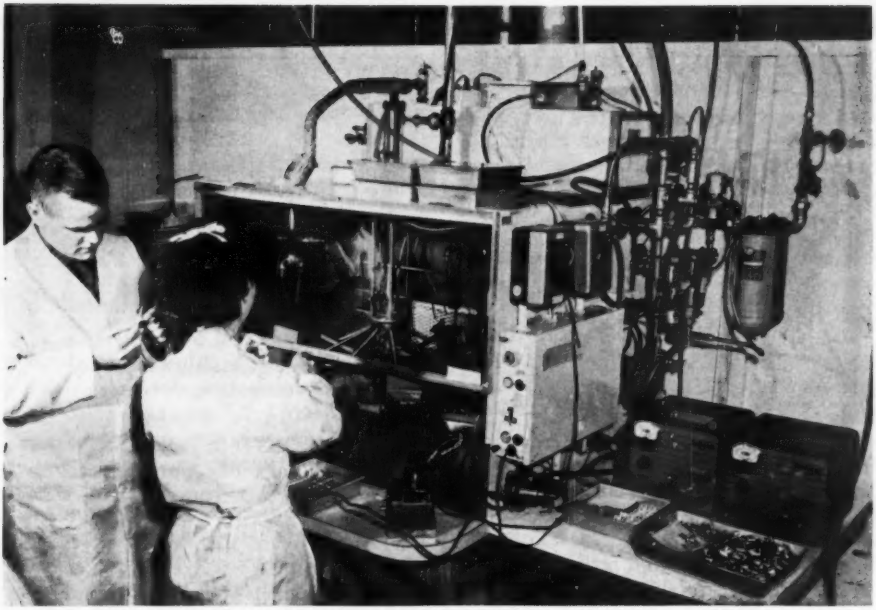


Charles Parke, production engineer at the Potter and Brumfield plant, a division of American Machine and Foundry Company, spot checks a part while operator removes remaining components from the cleaning system.

"WE MAGNIFY EACH PART 10 TIMES... DON'T FIND GREASE AFTER A NIALK® TRICHLOR BATH"

Workers handle delicate miniature relays with utmost care in Potter and Brumfield's "white room." Yet some contamination with dust and grease is inevitable.

"We assume everything is contaminated," continues Charles Parke, production engineer—and orders all of the minute parts cleaned with Nialk TRICHLORethylene.

100,000 parts between cleanouts.

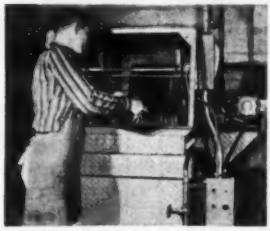
According to C. R. Stone, Director of Production, Nialk Trichlor removes the last bit of film on the metals. Potter and Brumfield degreases magnetic iron and nickel silver, running about 100,000 parts through between cleanouts.

They tried another vapor degreasing solvent, but "it didn't do the job Nialk Trichlor does. It wasn't distilling right and it wasn't doing the cleaning job."

Though much metal goes through every degreasing bath, this company doesn't have to titrate or run other tests.

Flush and vapor degrease—one trichlor

Potter and Brumfield uses one grade of trichlor for both flushing and vapor degreasing, considers this an important benefit.



And Mr. Stone concludes, "Hooker should get a large share of credit for the quality of parts produced by Potter and Brumfield."

You can get the same dependable cleaning with nonflammable Nialk TRICHLORethylene.

Hooker technical experts will help you set up your system. Then they'll check back with you regularly to make sure your flushing or degreasing operation stays trouble-free.

Talk to your Hooker Chemical distributor. He'll gladly help you with your problems and questions.

Or write us direct. We have years of experience to put at your disposal.

HOOKER CHEMICAL CORPORATION

1411 UNION STREET, NIAGARA FALLS, NEW YORK

HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.

For more data circle 402 on Postpaid Card

use as protective coatings for automotive trim, aluminum extrusions and household utensils during roll forming, deep drawing and bending operations.

Manufacturer: Guard Coatings Corp., 8-05 43rd Ave.,, Long Island City 1, N. Y.

For more data circle **25** on Postpaid Card

★ ★ ★

Pearl Pigment Powder Disperses in Plasticizers, Solvents, Resins

A non-lead synthetic pearl pigment in powder form that disperses easily in plasticizers, solvents and resins has been introduced by Rona Pearl Corp.

The product is heat stable, non toxic, has excellent luster and brilliance, produces comparatively low degree of sulfide staining.

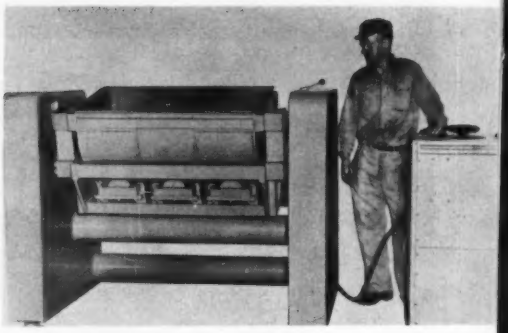
Manufacturer: Rona Pearl Corp., East 21st and East 22nd St., Bayonne, New Jersey.

For more data circle **26** on Postpaid Card

★ ★ ★

Vibratory Finishing Machine

The Vibrodyne vibratory finisher uses a resonant electromagnetic system to produce shaking forces up to 50 G's. It has only one moving part—the tub. A single knob adjusts amplitude from 0 to 5/16th inch. Continuous rotary turnover motion provides scrubbing action between media and parts, eliminating packing. Air-dumped tub is 37 by 20 by 15 inches deep.



Vibrodyne Vibratory Finisher: electromagnetic shaking

Manufacturer: Vibrodyne Div., Globe Industries, Inc., 125 Sunrise Place, Dayton 7, Ohio.

For more data circle **27** on Postpaid Card

★ ★ ★

Additive for Bright Dips Reduces Fumes, Drag-Out, Pitting, Streaking

Alchemize Additive LS'N is said to reduce processing difficulties inherent in aluminum bright dips. It lessens fuming, drag-out, pitting and streaking, improves color and brightness.

LS'N is suitable for any of the

CONFIDENT

"In a few weeks I will be setting up and running a new plating shop . . . I feel fully confident that your course has given me that extra bit of know how that will enable me to successfully perform my duties in this new location," writes L. Irwin of Palo Alto. You too can be confident after studying ELECTROPLATING KNOW HOW, the unique home study course. Write Dr. J. B. Kushner, Electroplating School, Box 2066p, Evansville 14, Indiana.

For more data circle 403 on Postpaid Card

IDEAL TACK RAGS

FOR A PERFECT FINISH

Bulk, Bagged, 72 yd. pieces in continuous lengths. Also Rolls.

Immediate Delivery

IDEAL CHEMICAL COMPANY

1499 DEAN DRIVE • SOUTH EUCLID 21, OHIO

For more data circle 404 on Postpaid Card

phosphoric-acid-based dips. Only 1 per cent, by volume is required. The product is completely stable at all concentrations and temperatures. It is expected to be useful in finishing aluminum parts for automobiles, aircraft, appliances, housewares, hardware and kitchenware.

Manufacturer: Alchemize Corp., 625 S. Kolmar Ave., Chicago 24, Ill.
For more data circle **28** on Postpaid Card

★ ★ ★

Nylon Abrasive Belt Produces Microfinish

An abrasive belt that's made by spraying a slurry of abrasive grain and an adhesive on a nylon fiber web is said to offer superior finishing results, labor savings, and lower costs.

The nylon belt resists water, heat and loading. It produces less heat in operation, is flexible enough to conform to irregular surfaces.

Manufacturer: Armour Alliance Industries, 16123 Armour St., N.E., Alliance, Ohio.
For more data circle **29** on Postpaid Card

Dawson Curtis, Armour lab technician, demonstrates polishing ability of Armour nylon abrasive belt. Copper plate was polished to microfinish in one pass.

BANISH TARNISH

with Clepo 170 from Gumm Laboratories.

This famous anti-tarnish compound leaves a colorless film protecting brass, copper and silver plate up to 12 months . . . two to five times longer if a clear organic coating is added. ■ Inhibits heat tarnish caused by soldering contact parts. Prevents spotting out on plated surfaces, antique copper finishes. ■ Widely used by leading manufacturers, Clepo 170 doesn't affect the appearance of the part, is fast working, economical, easy to use. ■ For details, send for Bulletin 960.

FREDERICK GUMM CHEMICAL CO. INC.
538 FOREST STREET
KEARNY, NEW JERSEY

PROGRESS THROUGH RESEARCH • SATISFACTION THROUGH SERVICE
CLEPO

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New Products . . .

Plastic for Ducts, Stacks, Hoods, Tank Covers

Kaylite is a plastic that is said to combine the strength and formability of thermoplastic-fiber laminates with the physical and chemical-resistant qualities of rigid polyvinyl chloride.

Properties are as follows:

1. Light. One-thirteenth the weight of steel, one-quarter that of aluminum.
2. High flexural strength for fabrication of various self-supporting structures.
3. Higher and lower temperature limits than solid polyvinyl chloride. Since the thermoplastic-fibre laminate core offers the structural strength, which is not affected until over 250 deg. F., the PVC-cladding does not have to offer any strength and can be used at higher than usual temperatures.
4. Essentially unbreakable—even at low temperatures.
5. Resistance to acids, alkalies, salts, water, high humidity, and a wide range of organics.
6. Good forming characteristics. Easy to bend and press-form on conventional forming equipment.
7. Excellent thermal, acoustical and electrical-insulating qualities.
8. Exceptionally good dimensional stability; a relatively low coefficient of expansion and contraction.

Uses of the product include fabrication of chemical duct work, stacks, hoods, tank covers and so on.

Manufacturer: Kaykor, 4391 S. Broad St., Yardville, N. J.

For more data circle **30** on Postpaid Card

★ ★ ★

Wet-Dry Blasting Machine

The Peenamatic Model 953 is a wet or dry blasting machine built by Metal Improvement Company.

PAINT STRIPPING CLINIC!

Send Us Your Tough Stripping Problems for Fast Action!

14th YEAR OF BECK PAINT STRIPPING CLINICAL SERVICE Saves Thousands of $$$ for Customers—Who Now Use World-Famous...

EPOXYSTRIP FASTEST WORKING LONGEST LASTING

Better find out for yourself . . . about Epoxystrip, Econostrip and other Beck Paint Remover lines and formulations. Use the BECK CLINIC SERVICE—send us several parts, sections, or test panels (properly tagged) of the work to be stripped.

Write or phone giving us essential information—your problem details, requirements, tanks available, hot or cold, etc. This service, and our prompt report, are free, with no obligation.

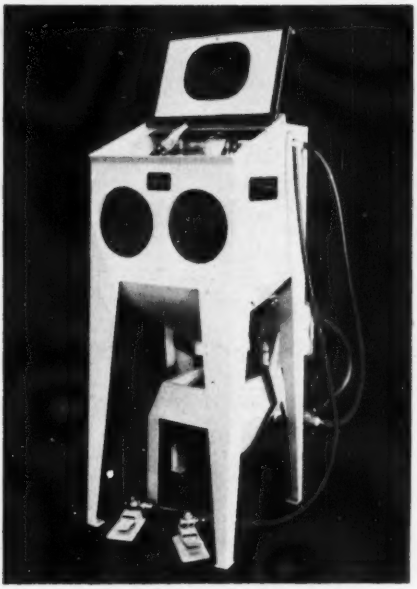
Beck Strippers outstrip all others—removing organic finishes, epoxies, etc., as easily as baked enamels, lacquers, etc. No stripping scum—clean rinsing!

WRITE FOR FREE FOLDER

BECK EQUIPMENT & CHEMICAL CO.

3350 WEST 137th STREET — CLEVELAND II, OHIO

For more data circle 406 on Postpaid Card



Peenamatic Model 953 with pump

This economy model is offered with pneumatic agitator or with a pump for high production.

Features include a lightweight rubber blasting gun and a packless pump equipped with a special wear plate which prolongs service life.

Options also include removable hatches for long parts and internal nozzles to blast blind and through holes to i.d.'s as small as ¼ inch.

Model 953 is capable of blasting with either dry or wet media for blending tool marks, removing discoloration, scale or burrs, and for cleaning various parts and materials.

Manufacturer: Metal Improvement Co., 1721 E. 47th St., Los Angeles 58, Calif.

For more data circle **31** on Postpaid Card

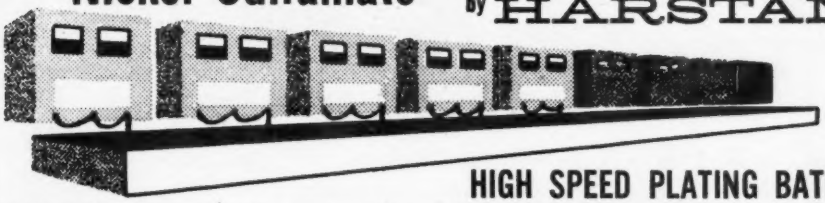
★ ★ ★

Electroless Nickel Plating Bath

Enplate Ni-410 chemical nickel plating bath has been developed by

(continued)

Nickel Sulfamate and METALLIC FLUOBORATES by HARSTAN



HIGH SPEED PLATING BATHS

Nickel Sulfamate, one of the most soluble Nickel salts, has remarkable low stress and high ducility characteristics over a wide range of current densities and temperatures. Application include Electroforming, Electrotyping, Electronics, Manufacture of Records, Missile Cones and wherever a heavy deposit of nickel is required in a minimum amount of time.

Metallic Fluoborates produce heavy, smooth, fine grain deposits rapidly. They are concentrated liquids. The baths are simple to make up, easy to control and maintain. A few of the numerous metallic fluoborates available are Lead-Tin (Solder Bath), Lead, Tin, Copper, Nickel, Cadmium and Zinc. Their many uses include Electroplating, Electroforming, Solder Plating, Printing of Circuits, Wire Plating and the Manufacture of Records.

For complete information, write for free literature on any or all of these products without obligation.

HARSTAN CHEMICAL CORP.
1247 38th STREET, BROOKLYN, N. Y. • GEdney 5-8225

ELECTROLESS NICKEL • ANODES • ACIDS • CLEANERS • BRITE DIPS
RUST REMOVERS • SOLVENTS • PLATING CHEMICALS & EQUIPMENT

For more data circle 407 on Postpaid Card

Enthone, Inc. It deposits a uniformly thick, hard, corrosion-resistant nickel plate without the use of electric current.

Enplate Ni-410 will deposit electroless nickel by chemical reduction on aluminum and other metal substrates, in addition to plastics, glass, rubber, and many other non-conductors. It deposits a nickel-phosphorous alloy which is more corrosion resistant than electroplated nickel, Enthone reports.

At an operating temperature of 190 deg. F., the plating rate will initially be 0.375 to 0.400 mils/hr. The bath can be maintained for long periods by replenishment and pH control.

Manufacturer: Enthone, Inc., 442 Elm St., New Haven 8, Conn.

For more data circle **32** on Postpaid Card

Chemical-Resistant Floor Surfacers

Two products for protecting new industrial floors and restoring old ones.

The two-component products cure to a tough, impact-resistant surface that's ideal for industrial floor areas.

The materials resemble concrete in bonding characteristics and application techniques, yet they are stronger and more abrasion and corrosion resistant than Portland concrete. Applied at thicknesses of 1/16 to ¼ inch, these products produce a surface that has excellent resistance to dust, chemicals and oils. Both adhere tenaciously.

The difference between the two products is that one is designed for addition of a fine aggregate while the other is inert filled.

Manufacturer: Better Finishes & Coatings, Inc., 268 Doremus Ave., Newark 5, N. J.

For more data circle **33** on Postpaid Card

New!

Alchemize Additive

LS'N

for Aluminum Bright Dips

- Drastically reduces Fumes and Drag-Out
- Improves color and brightness
- Eliminates pits and streaks
- Saves twice its cost
- *Write for technical data*

Patents and Patents Pending

ALCHEMIZE CORPORATION

Congress Expressway and South Kolmar, Chicago 24, Illinois

CHEMICAL POLISH FOR ALUMINUM

Alchemize

For more data circle 408 on Postpaid Card

FREE LITERATURE

40. Ultrasonic Cleaning Equipment
Specifications and prices for ultrasonic cleaning systems, ultrasonic generators, transducerized tanks, immersible transducers. Acoustica Associates, Inc.

41. Chemical Polishing Solutions for Aluminum
Information on Alchemize solutions for leveling surfaces and producing finishes from satin to mirror bright. Alchemize Corporation.

42. Safer Solvents
"Methylene Chloride for Raising Solvent Flash Points and Its Effect in 27 Solvents," a reprint of an article on a solvent that improves safety of many solvent combinations. Solvay Process Div., Allied Chemical Corporation.

43. Air-Dry Lacquer
Champion air-dry No. 2 clear lacquer for gold, brass, copper and bronze. Uniform finish, no seeding problems. Agate Lacquer Mfg. Co., Inc.

44. Chromate Coatings, Cyanide Zinc Plating
Technical data chart on chromate conversion coatings. Lists purposes for which these coatings are applied, shows various types available. "Practical Cyanide Zinc Plating" presents a complete technical discussion on this subject. Allied Research Products, Inc.

To obtain any of these bulletins quickly, circle the corresponding numbers on postpaid Reader Service card opposite page 144.

45. Washing Machines
A 28-page brochure on cleaning machinery and conveying systems used in finishing. Alvey-Ferguson Co.

46. Phosphate Coatings for Steel
Bulletin 1380B contains detailed information on Granodine phosphate coatings for steel. Amchem Products, Inc.

47. PVC Tank Lining
A six-page brochure. Amer-Plate industrial lining, a dense, flexible polyvinyl chloride sheet for lining plating, pickling and other tanks and vessels. Protects steel and concrete from strong solutions. Two types available: one for existing installations, one for new work. Amercoat Corporation.

48. Anodes for Acid Copper Plating
Reprint of a technical paper that describes a synthesized anode containing small quantities of phosphorous, tellurium, selenium and silver. The Anaconda American Brass Co.

49. Solvents and Thinners
Information on the characteristics of APCO solvents and thinners: Troluoil, Dryolene, Apcothinner, mineral spirits, others. Apco Oil Corp.

50. Felt Polishing Products
A 12-page booklet describes felt wheels, tells about typical applications; has table to aid in selection of felt wheels; table of specifications; directions for setting up and caring for felt wheels; maintenance "do's" and "don'ts"; other useful data. Bacon Felt Co.

51. Metal-Cleaning—
Heat Processing Equipment
Catalog describes line of degreasers and ovens. Special metal cleaning and heat-processing units are illustrated. Catalog No. 10M 359. Baron Industries.

52. Paint Strippers
Information on stripping formulations for removing epoxies and other organic finishes that resist stripping. Beck Equipment & Chemical Co.

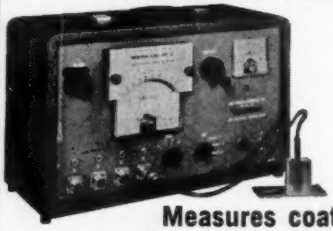
53. Rectifiers
Describes silicon rectifiers, selenium rectifiers, special rectifiers, remote controls, constant-voltage controls, finger-tip stepless controls. Belke Manufacturing Company.

54. Chromic Acid
Information on BFC chromic acid. Better Finishes & Coatings, Inc.

55. Paint Heater
Literature on Binks non-circulating paint heaters, models 42-2000 and 42-2001. Bulletin No. A42-1R. Binks Mfg. Co.

56. Stable Degreasing Solvent
Information on Blacosolv trichlorethylene degreasing solvent, which incorporates entirely new stabilizers that prevent breakdown and acid formation. G. S. Blakeslee & Co.

The Latest
DERMITRON
NON-DESTRUCTIVE THICKNESS TESTER!



Measures coatings rapidly and accurately.

Instantly measures the thickness of metallic and non-metallic coatings and films.

Write for complete information.

UNIT PROCESS ASSEMBLIES, INC.
UPA
53-15 37th Ave., Woodside 77, N.Y.

For more data circle 409 on Postpaid Card

57. Tack Cloth
Literature on treated cloths that pick up dust and lint prior to paint finishing. Bond Chemical Products Co.

58. Protecting Polished Surfaces
Four pages on Neotex protective mesh, a neoprene matting that keeps polished or delicate parts from being scratched or damaged during manufacture, inspection, transit. Used for lining benches or work tables, as a surface for conveyor belts. Research Products Corporation.

59. Automatic Control of
Black Oxide Baths
Application Data Sheet No. 064.1-2 outlines control problems involved in applying black oxide coatings and suggests solutions through instrumentation. The Bristol Co.

60. Metal-Processing Products
A six-page folder describes the products made by Bruce Products Corporation: buffing compounds, drawing compounds, cutting oils, non-rust oils, spray booth coatings, cleaners, polishing wheels, die-cut release agents. Bruce Products Corp.

61. Fiber-Backed Abrasive Disc
Brochure on a fiber-backed abrasive disc that's useful in lighter grinding operations such as stainless steel grinding and blending of solder and fillers. Carborundum Co.

62. Horizontal Barrel
Finishing Machines
Bulletin 100 describes and illustrates Burr-Rite Senior Barrel Finishing Machines. Capacities of 5.7 to 38.5 cubic feet; neoprene or rubber-lined steel; compartment machines. Advantages, construction features and specifications. Casalbi Co.

63. Heat Recovery and Air Correction
Information on recovering heat from the fumes produced in paint-baking ovens. Catalytic oxidation of fumes removes odors, supplies recoverable heat. Catalytic Combustion Corporation.

64. Spiral Buffing Wheels
Information on company's new Spyrl-Roll® buffing wheels. Construction of these buffs causes a "sidewise" cutting action that reduces streaking, cuts time required for buffing. Geo. R. Churchill Co., Inc.

65. Complete Finishing Systems
Catalog No. 200 describes company's design, fabrication and installation services for complete finishing systems. Includes information on equipment for pre-paint treatment, paint application, paint drying and baking, make-up air and exhaust systems. Contains descriptions

of typical installations and detailed information on individual components. Cincinnati Cleaning & Finishing Machinery Company.

66. Fused Quartz Infrared Ovens
A 4-page folder describes and illustrates Clepco fused quartz infrared ovens. Bulletin RLC-201. The Cleveland Process Company.

67. Automatically Finishing Dials
Brochure on new machine for filling, wiping and polishing dials, control knobs, nameplates and clock-faces at rates up to 2500 parts per hour. Conforming Matrix Corp.

68. Vacuum Metallizing
Bulletin 2-2. 27 pages on vacuum metallizing, history of its development, types of coatings, procedures, lacquering techniques, color coated items, coating equipment, accessories, etc. Consolidated Vacuum Corporation.

69. Buffing-Compound Remover
A four-page folder describes advantages of Buff-Off, a product that is said to significantly improve the ease with which buffing compound is removed from zinc die castings prior to plating. Cowles Chemical Co.

70. Bronze Powders
New color card shows 44 brilliant metallic bronze powders. Golds, coppers, aluminums, grays, browns and pastels. Includes complete directions for use and application. Crescent Bronze Powder Co.

71. Buff Cloth
Brochure describes research efforts to develop an improved cotton cloth for use in buffs. Tells how this cloth gives better control in buffing. Deering Milliken, Incorporated.

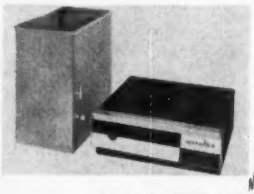
72. Spray Booths
A comprehensive catalog (I-7000-A) describes spray booths of various types: water wash, paint arrestor, dry baffle. Complete information on construction features and operation of each type. Selection data. 35 pages. The DeVilbiss Company.

73. Vapor Degreasing
"Vapor Degreasing with Diamond Perchlorethylene" is the title of a 12-page technical bulletin that presents data on 13 major advantages of vapor degreasing prior to painting, plating and other finishing operations. Includes sections on essentials of vapor degreasing equip-

(continued)

ACOUSTICA ULTRASONICS MAY CLEAN YOUR PRODUCT 18 TIMES FASTER!

An Acoustica ultrasonic cleaning system is the *fast* way to clean your products—no matter how dirty or complex they may be. For instance, ultrasonics reduces cleaning of ball bearing assemblies for one company from a 12-minute manual operation to a mere 40-second dip. An Acoustica cleaning system will save you time, money and manpower—and give you superclean results! Write for free case histories.



COMPLETE LINE OF VACUUM-TUBE AND TRANSISTORIZED CLEANING SYSTEMS. WE INVITE YOUR REQUIREMENTS FOR CUSTOM-DESIGNED UNITS.

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For more data circle 410 on Postpaid Card

ment, methods of scheduling vapor-degreaser cleanouts and solvent distillation. Diamond Alkali Co., Chlorinated Products Div.

74. Degreasing Solvent
A 16-page booklet describes characteristics of Chlorothene, a metal-degreasing solvent with high-power solvency, low-corrosion properties, high stability, low toxicity properties. Can be used as a dip, spray, or for wiping. Many uses of this solvent are described. Dow Chemical Co.

75. Rectifier Conversion Kit
Catalog on silicon conversion kits for plating rectifiers. Dresser Electric Co.

76. Drying and Baking Booklet
Data Booklet D117 shows how heating units and ovens of all sizes and shapes can be built at low cost from prefabricated interlocking infrared sections. Dry Clime Lamp Corp.

77. Sodium Cyanide
A 12-page brochure describes physical forms of cyanide, gives storage instructions, includes data on physical properties of sodium cyanide, tells how to dispose of cyanide wastes. Electrochemicals Dept., Sodium Products Div., E. I. du Pont de Nemours & Co., Inc.

For Platers, Silversmiths, Jewelry Mfgrs., Makers of Watches, Clocks and Electronics and other metal finishers.
Supplied in straight or crimped brass, steel, nickel silver or stainless steel wire in sizes .0025 to .006 and in bristle, fibre or Nylon. Special sizes and shapes to order.
Write (Dep't. P) on your letterhead for catalog and price list.
DIXON & RIPPEL, INC. Box 116 Saugerties, N. Y.
ESTABLISHED 1856
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78. Stripper
Folder describes No. 153 Stripper, a nonflammable volatile solvent-type stripper with very little toxicity. Has excellent penetrating properties, is said to be useful in removing coatings that are difficult to remove, such as melamines, epoxies, vinyls, plating rack coatings. Dytex Chemical Co.

79. Butadiene-Styrene Resins for Surface Coatings
A 20-page booklet tells what Buton resins are, describes their uses for appliance finishes, automotive primers, can coatings, flat steel primers, other applications. Includes discussion of physical properties, performance qualities, and so on. Enjay Chemical Co.

80. Dilute Zincate for Plating on Aluminum
Alumon "D," a chemical that's used at lower concentrations to prepare surface of aluminum for plating. Less dragout, freer rinsing, more uniform zincate film. Enthone, Inc.

81. Copper Anodes
Information about Asarco-Max copper anodes, which are made by a patented process that produces an extremely uniform grain structure. Federated Electro-Chemicals Dept., American Smelting and Refining Co.

82. Cost-Cutting Ideas in Finishing
Booklet includes description of the Gasway Kinetic Kurtain Coater. Applies uniform thickness of paint coating. Smooth films, no flow marks, high-speed roller coating economy. Gasway Corporation.

83. Airless Spray Equipment
Catalog Section E-1. 12 pages. Airless spray equipment and accessories. Specifications included. Gray Co., Inc.

84. Paint Can Shaker
Data sheet on the Bull Dog Shaker, a vibrator that shakes paint cans with the lid on to mix contents. Grenier & Co.

85. Aluminum Finishing Manual
A 16-page booklet on cleaning of aluminum and its alloys. General discussion of aluminum alloys, treatment processes for wrought aluminum and for cast aluminum, operating data for Clepo compounds, use index. Frederick Gumm Chemical Co., Inc.

86. Buffing Work-Holding Machine
Bulletin 421 describes the Hammond Cammed Junior Automatic work holding machine for holding other than round work pieces that are being buffed by a regular polishing or buffing lathe or abrasive belt machine. Hammond Machinery Builders, Inc.

87. Nickel Sulfamate Plating
A 16-page technical instruction bulletin describes H-VW-M Nickel Sulfamate plating process, used for heavy build-up in metal resizing, electroplating, electroforming, functional uses. Complete description of solution preparation for both still and barrel plating operations. Solution is premixed—no dry chemicals to dissolve, except nickel chloride, when desired. Hanson-Van Winkle-Munning Company.

88. Duplex Nickel
Literature on the Harshaw Perflow-Perglow Duplex nickel plating process. Harshaw Chemical Co.

89. Metallic Fluoborates
Technical bulletins on properties and applications of metallic fluoborates. Harstan Chemical Corp.

90. Plating, Polishing and Painting Equipment
A new catalog sheet lists complete line of plating, polishing and spray painting equipment and supplies. All items are listed alphabetically for easy reference. J. Holland & Sons, Inc.

91. Vapor-Degreasing Stabilizers
Bulletin 70 discusses the importance of stabilizers in degreasing solvents, tells about the stabilizer used in Nialk trichlorethylene. Hooker Chemical Corp.

92. Metal Cleaners
Bulletin B-8 describes a complete line of metal cleaners. Classified according to the metal being cleaned, it gives information on operating conditions, types of material, and so on. Hubbard-Hall Chemical Co.

93. Chromate Dip for Aluminum
Information on Rodip A1-50, a chromate coating that protects aluminum with a film golden to brown in color. R. O. Hull & Co., Inc.

94. Tack Rags
Literature on Ideal Tack Rags, specially treated cloths that pick up dust and other particles just prior to application of an organic finish. Ideal Chemical Co.

95. Chemical Equipment Bulletin
Bulletin GEN 61 describes pressure filters, ion exchangers, demineralizers, water softeners, centrifugal pumps, heat exchangers, water-treatment systems. Industrial Filter & Pump Mfg. Co.

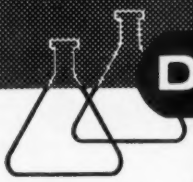
PAINT STRIPPER

THE NEW MIRACLE

STRIPEX #153

NO HEAT NECESSARY!

A mild steel tank is all that is required. Strips All Types of Baked Enamels.
Some Baked Coatings are Stripped Clean in a matter of Seconds.
Excellent for stripping vacuum metallizing racks.



DYTEX

Chemical Specialties

DYTEX CHEMICAL COMPANY

PROVIDENCE 3, Rhode Island

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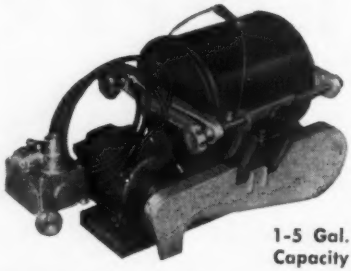
96. Decorative Plated Coatings for Improved Durability
Information on nickel plates with improved corrosion resistance. International Nickel Company, Inc.

97. Zinc Phosphate Coating
Four-page folder on Meta Bond, a zinc phosphate for protecting metal products prior to painting. Includes data on crystalline structure, degree of protection afforded by this system in comparison to other conversion coatings. International Rustproof Corporation.

98. Vibratory Finishers
Information on the Jackson Vibrado, a vibratory finishing machine with improved tub design that is said to eliminate eddy current. Jackson Vibrators, Incorporated.

99. Wood Tanks
Information on wood tanks for pickling and plating. Kalamazoo Tank & Silo Co.

100. Plant Maintenance Chemicals and Equipment
Chemicals for paint-line maintenance, cleaning machinery, equipment overhaul, cleaning of walls and lighting fixtures. Steam cleaning machines, combination steam cleaning and phosphatizing machines. Bulletin P-9614. Kelite Corporation.



1-5 Gal. Capacity

Model 4 Bull Dog Shaker

Will condition paint to brushing consistency in one to five gallon cans without opening the can. Time required is from two to thirty minutes depending on the paint formulation and the length of time it has been on the shelf. Simply place the can in the saddle, tighten the end plates and flip the switch. Bull Dog will do the rest.

GRENIER & CO., INC.
13142 REXFORD ST., BLUE ISLAND, ILLINOIS

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101. Electronic Thickness Tester
Bulletin 400 gives details on the Kocour Electronic Thickness Tester; has "question and answer" section. Kocour Co.

102. Stress Measurement
A 4-page bulletin on the Stresometer, a simple, practical instrument for determining the amount of residual stress in chemically and electrochemically deposited metals. Joseph B. Kushner.

103. Junior Automatic Plating Machine
Catalog on the Daw Junior fully automatic plating machine. Has provision for automatic cycle selection, automatic unloading, easy modification. Lasalco, Incorporated.

104. Abrasive Finishing Methods
Abrasive grits and grades, wheel speeds, type of buff reommended for finishing thermoplastic and thermosetting materials. Lea Manufacturing Co.

105. Tumbling and Burnishing Barrels
Catalog on Reliance tumbling and burnishing barrels. Describes and illustrates many different types. Chas. F. L'Hommedieu & Sons Co.

106. Deburring Ferrous Metals
Complete data on granite natural abrasive chips and abrasive powders. Hints on achieving faster cutting action and better finishes. Lupoline Automatic Polishing Equipment Corp.

107. Wash and Rinse Machine
Information on a machine that's designed for cleaning parts between machining operations and prior to inspection. The MacLeod Co.

108. Rust Preventive
Data sheet on Magnafilm 120, a solvent-cutback rust preventive that leaves a thin, transparent film which protects metal from moisture and fingerprints. Magnus Chemical Co., Inc.

109. Solution Cooler
Bulletin AC-1 describes a packaged refrigeration system designed for cooling plating, anodizing and other corrosive solutions. No coils in tank. No external heat exchanger. Mayer Refrigerating Engineers, Inc.

110. Zinc Brightener for Barrel Plating
Bulletin on a zinc brightener for the economical production of brilliant zinc barrel deposits directly from the bath. Eliminates bright dipping, affords maximum throwing power. Meaker Co., subsidary of Sel-Rex Corp.

111. Synthetic Pearl Essence
Revised edition of 8-page Nacreous Pigment Handbook covers Murano colors, synthetic pearlescent finishes in color, and Mearlite, a non-lead pearl pigment. Mearl Corporation.

112. Plating Rack Coating
Information on Unichrome Coating 218X, a plastisol plating rack protective coating. Metal & Thermit Corporation.

113. Finishing Systems
Bulletin shows integrated systems for applying organic coatings. Shows typical installations, describes product being painted along with specifications for the system in use. Michigan Oven Co.

114. Heat-Resistant Gold Finish
Brochure gives complete data on Gold Sicon, an attractive gold-colored finish that withstands temperatures up to 500 deg. F. without peeling, flaking, discoloring, etc. Midland Industrial Finishes Company.

115. Polishing Cost Check
Cost Check 5-4-5 Kit helps to cut costs in grinding, polishing, finishing. Minnesota Mining and Manufacturing Co., Dept. ABE-80.

116. Paint Mixer
Data sheet on Miracle paint rejuvenators, which mix paint without removing the lid from the container, by shaking the can vigorously. Miracle Paint Rejuvenator Co.

117. Drum-Handling Tools
Literature on a line of drum-handling tools and equipment: drum wrenches, drum upenders, carts and so on. Morse Mfg. Co., Inc.

118. Pressure-Sensitive Tapes
A 44-page guide to Mystik pressure-sensitive tapes gives reference data on paper masking tapes, packaging tapes, protective coverings, high-low temperature tapes, electrical tapes, printable tapes, specialties. Industrial Div., Mystik Adhesive Products, Inc.

119. Screen Process Supplies
A 64-page catalog on screen-process equipment, colors and supplies. Among the products covered are printed-circuit plating and etching resists, epoxy resin ink, silk screen plate-making equipment, film and supplies, other products. Naz-Dar Co.

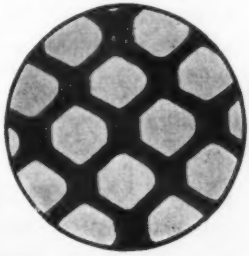
120. Centrifugal Dryer
Four pages on the New Holland Kreider centrifugal dryer. Excellent illustrations of construction features and operational advantages of this unit. Specifications. New Holland Machine Co.

121. Airless Spray
Two new folders on airless spray systems and a new gun, the Versa Gun. Nordson Corporation.

PROTECT FINE PLATED SURFACES

with **RP** *Neotex*®
PROTECTIVE MESH

Neotex . . . the open pattern Neoprene rubber matting, protects highly polished finishes when used to line any surface where goods are worked on or in transit. In roll form, Neotex can be easily cut to any size or shape . . . it's rugged and long lasting, resistant to abrasives, caustics, heat, acids, oils, oxidation. Open pattern permits buffing compounds to settle. Available in a fine or coarse pattern. Write for complete information.



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RESEARCH PRODUCTS CORPORATION
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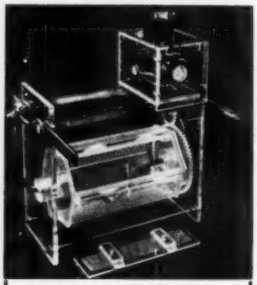
122. Pressure Blasting with Manufactured Abrasives
Special report describes applications for pressure blasting, tells how to select and use silicon carbide and aluminum oxide abrasives. Norton Co.

123. Tanks, Tank Linings
Short-form catalog lists company's line of products: tanks, tank linings, plastisol coatings, plating barrels, dipping baskets. Nu-Lite Plating Equipment Co.

124. Brighteners
Four-page folder gives brief description and properties of a new bright nickel process, a barrel bright nickel, a semi-bright nickel designed to eliminate stress problems, and an acid copper with excellent throwing power. Nuodex Products Div., Heyden Newport Chemical Corp.

125. Cleaner-Phosphatizer
Four pages on Oakite Cryscoat 187, an iron phosphate for simultaneous cleaning and phosphatizing in tanks. Chemical stability, positive corrosion control, long solution life. Oakite Products, Inc.

126. Automatic Polishing Machines
Folder describes and illustrates various models of automatic polishing machinery: straight-line conveyor, rotary types, horizontal conveyor. The Packer Machine Co.



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127. Bonderites for Aluminum
A four-page folder on Bonderite coatings for aluminum describes Golden Bonderite and Green Bonderite, has data on methods of application, salt-spray tests. Parker Rust Proof Co.

128. Solid Aluminum Etchant
Bulletin describes Pennsalt solid aluminum etchant and a new pushbutton makeup system for adding it to etching tanks. Pennsalt Chemicals Corporation.

129. Vapor-Spray-Vapor Degreasers
Four pages on principles of operation, solvent cycle, specifications, features and construction. Phillips Manufacturing Co., Inc.

130. Longer Life for Aluminum Siding
Information on an acrylic coating that's specially formulated to provide long life on aluminum siding. Pittsburgh Plate Glass Co., Industrial Finishes Div.

131. Electric Infrared
A 16-page catalog describes the Radcor temperature-rating method for automatically providing the right answer to electric infrared heating problems. Lists 540 vertical and 144 horizontal standard models plus price for each. Catalog BRG-115. Radcor, Inc.

132. Electrostatic Spray
No. 2 Process brochure tells how Ransburg No. 2 Process can improve quality of painted products and cut costs at the same time. Ransburg Electro-Coating Corporation.

133. Lead Anodes
Bulletin RA-15 tells why all lead anodes are not the same. Describes features of solid round, hollow round, flat ribbed, and conforming anodes. Details on various types of hooks. Republic Lead Equipment Co.

134. Dry Filters for Spray Booths
Four pages on RP Paint Arrestors. Comparative performance data, construction details, different ways to use dry filters. Research Products Corp.

135. Pearl Pigments
Properties, typical uses and general procedure concerning the application of pearl pigments. Complete technical data on pearl pigments. Rona Pearl Corporation, a division of Rona Laboratories, Incorporated.

136. Drip-Free Paint Dipping Process
Smart Controlled-Withdrawal Paint-Dipping Process works on the principle of raising the dip tank to immerse the work hanging above on a conveyor. Slow, even withdrawal removes drips by surface tension and capillary action. J. O. Ross Engineering Div., Midland-Ross Corporation.

137. Selecting Barrel Finishing Media
Discussion of problems in the selection of abrasive media and compounds for vibratory and barrel finishing. Illustrations of bonded preforms and hardened steel shapes. Roto-Finish/Ransohoff.

138. Pipeline Strainers
Sarco Bulletin No. 1210. Describes four basic types of pipeline strainers for condensate. Details construction and operating features of strainers designed to protect steam traps, pumps, control valves, compressors and other equipment from dirt, scale, metal chips, etc. Sarco Co., Incorporated.

139. New Wool Polishing and Compounding Pad
Information on the Ray-Buf, a new all-purpose polishing and compounding pad that is said to produce higher lusters more quickly. Schlegel Manufacturing Company.

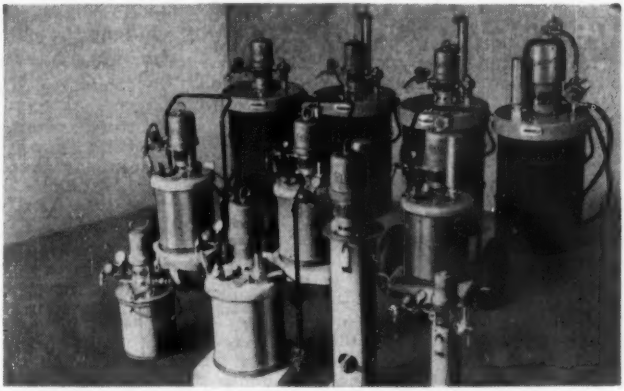
140. Gold Plate, 24K
Bulletin 175BT, five pages of technical data on Temperex HD Process, an acid-type electroplating formulation that produces 24 karat gold deposits of any practical thickness. For both still and barrel plating. Recommended for high - temperature applications and for electroforming. Sel-Rex Corp.

141. Miniature Filter Pump
Bulletin 602 describes full-view miniature filter pumps for filtering corrosive or expensive solutions. Sethco Manufacturing Corp.

142. Plating Localized Areas Without a Tank
An 8-page booklet on Dalic electroplating with a solution-saturated swab on a Dalic plating tool. Useful in plating small areas of parts that would normally require extensive masking and for plating areas on large parts that cannot be immersed in a tank. Sifco Metachemical, Inc.

143. Cleaning Machine
Bulletin 107 describes the Simplicity Vibra-Washer, a machine designed to clean or process ferrous and non-ferrous

(continued)



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Eleven models to choose from—stationary, portable or standpipe—5 gallon to 55 gallon capacities. And you can pick from a variety of different tip sizes that handle anything from protective coatings to fine finishes.

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machined parts, stampings and castings at high production rates. Shows how the machine is constructed, how it operates, etc. Industrial Washer Div., Simplicity Engineering Co., Durand, Mich.

144. Organic Solvents Handbook
Definitions, evaluation methods, applications for various organic solvents. The Solvents and Chemicals Group.

145. Weather-Testing Service
Data sheet describes company's scope of activities, facilities, special services. South Florida Test Service.

146. Airless Spray
Information on the complete line of HydraAirless 20 Systems is given in Catalog Sheet PM 918. Spee-Flo Co.

147. Finishing Systems
A 36-page book describes and illustrates complete finishing systems and components such as washers, dryers, bake ovens, flow coat systems, dip-painting systems, spray painting systems, others. Includes diagrams of several systems, comparison of operating costs for Spra-Con systems vs. other types. Also has a page of useful engineering formulas and constants. The Spra-Con Company.

148. Process for Coating with Fiberglass
Information on the Spray-Bilt gun for applying a fiberglass finish on any clean metal surface. Spray-Bilt, Inc.

149. Hydraulic Atomizing Spray Nozzles
Fluid atomized by hydraulic pressure—no atomizing air required. For lubricating dies, sheet, strip stock and chain, spray coating, marking or any other operation where automatic on-and-off spray control is required. Bulletin 115. Spraying Systems Co.

150. Electrostatic Spray Painting Equipment
Four pages on new Staticote Model 120-5T. Lists features, shows typical installation, describes new current limiter circuit, simplified controls. Information on sensing and automatic-trip systems, accessories. Staticote Systems, Inc.

151. Economical Spray Booth Maintenance
Literature on Booth strip includes case history which explains reasons for savings in booth-maintenance costs; description of properties of this water-base strippable coating; and listing of properties. Spraylat Corp.

152. Automatic Barrel Plating Machine
A 4-page bulletin on Little Steve, a barrel plating machine that's completely automatic, including loading, unloading and drying. For plating or processing large quantities of small parts. Frederic B. Stevens, Inc.

153. Zinc Plating Additive
Data on Zinc Brite, a cleansing and purifying agent for cyanide zinc plating solutions. Sulphur Products Co., Inc.

154. Vibratory Materials-Handling Equipment
Condensed catalog describes line of vibratory materials-handling equipment, vibrating parts-handling equipment, mechanical shaft seals, paper joggers, portable power tools, power rectification equipment. Catalog No. 616. Syntron Co.

155. Gold-Recovery Unit
Information on the Gold-Saver, a resin-filled unit that separates gold from rinse water, allowing recovery of gold from gold-plating processes. Technic, Inc.

156. Etch Primer
Data on Gripalloy, an etch primer available in black and colors. Used as primer or finish coat. Tenax Finishing Products Company.

157. Cob Grit for Blasting, Tumbling
Information on corn cob grits that are used as tumbling media and in blast cleaning. Ti-Co Industries, Inc.

158. Titanium Anodizing Cylinder
Data sheet describes and illustrates an all-titanium anodizing cylinder that is useful in bulk processing of bolts, rivets, screws. Requires no stripping, resists acids. Titanium Products Corporation.

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INCREASES YOUR PRODUCTION, IMPROVES QUALITY, CUTS COST!
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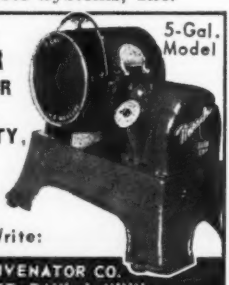
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McKeon's "Liquid Sulphur"
Processes described in detail.
Sulphur Products Co., Inc.
McKeon Bldg., 621 W. Pittsburgh St., Greensburg, Pa.

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159. Hammer Finish
Information on Tousey Hammercote, a hammer-type finish said to produce uniform patterns, hard, mar-proof films. Tousey Varnish Co.

160. Brass Plating Solution
Technical bulletin on True Brite brass solution, which is available in a variety of colors. True Brite Chemical Products Company.

161. Vapor Degreasers
Informative booklet contains sections on cleaning methods, types of degreasers, design features, safety. Also general information on trichlorethylene, its specifications and safe handling procedures. Article on health hazards created by exposure to "tri." Uddeholm Company of America, Inc.

162. Side-Opening Electroplating Filters
Four-page folder gives specifications for a line of centrifugal or self-priming, positive-displacement pumps with capacities of 200 to 10,000 g.p.h. Udylite Corporation.

163. Ultrasonic Cleaning
Data sheet shows various types and sizes of ultrasonic cleaning setups. Ultrasonic Industries, Inc.

164. Thickness Tester
Bulletin DF describes the Dermitron, an instrument for non-destructive coating thickness determination of metals on metals, metals on non-conductors, nonductors on metals. Unit Process Assemblies, Inc.

165. Ball Anodes
Information on the advantages of using ball anodes in titanium containers. Univertical Corporation.

166. Sealless Pumps
Catalog No. 10, eight pages on a new sealless pump recommended for corrosive chemicals, abrasive slurries, pharmaceuticals, foodstuffs, gases. Complete description of features, exploded drawings to show parts and servicing, tables of performance data, list of materials of construction, typical uses and recommended materials. Vanton Pump & Equipment Corp.

167. Rotary-Shelf-Batch-Type Ovens
Data sheet 203-9 describes and illustrates batch-type ovens with shelfs that rotate so that products being processed can be examined easily. Despatch Oven Co.

168. New Ultrasonic Cleaning Equipment
Information on ultrasonic cleaning equipment recently developed by Westinghouse. Compact, efficient, sturdy, excellent performance. Westinghouse Electric Corporation, Industrial Electronics Dept.

169. Centrifugal Galvanizers
A six-page bulletin describes the 402-G galvanizer with an automatic cycle which closes the lid, spins the work, stops rotation and opens the lid; the 152-G galvanizer, for limited production; and the 402-G galvanizer for high production. Importance of direct drive used on these machines is explained. The Leon J. Barrett Co.

170. Stripping Silver, Brass, Copper, Copper Alloys
Technical Data Sheet No. 127, a 2-page usage and instruction sheet on an acid metal stripper. No current required. No etching. Long life. Strips off 0.0001 inch per minute. MacDermid, Inc.

171. How To Evaluate Sonic Energy Cleaning Equipment
Bulletin 101 describes the components necessary for a sonic energy cleaning system and the factors that should be considered in evaluating each of these components. 12 pages. Bendix Corp.

172. Abrasive Belt Machines
Brochure sets forth the specifications and advantages of Curtis 150 series abrasive belt machines, which handle pieces from 1/20th to 3 inches thick and up to 49 inches wide at infeed rates of up to 100 linear feet per minute. The Carborundum Co.

173. Cleaners
Specification sheets for a number of cleaners: for ferrous metals, brass, aluminum; control chart; recommended procedures. The Chemical Corporation.

174. Industrial Metal Cleaning
A 12-page booklet discusses factors involved in selection of cleaners, equipment for cleaning. Comparison of advantages offered by various methods of cleaning. Nox-Rust Div., Daubert Chemical Co.

175. Spray Cleaner
Bulletin describes Diversey 519, a spray cleaner for ferrous and non-ferrous metals. This product quickly penetrates soils, emulsifies and disperses contaminants, rinses freely. Prevents scale on spray nozzles. Diversey Corp.

176. Radiant Heat
An 8-page brochure explains principles of radiant heat, the equipment required and typical applications. Fostoria Corp.

177. Testing Equipment
Bulletin describes a wide variety of paint-testing equipment such as gloss-meters, viscosity cups, impact testers, reflectometers, colorimeters, and so on. Gardner Laboratory, Inc.

178. Selection of Gas and Electric Infrared Ovens
A handy guide to selection of gas and electric heating equipment for heating, drying and curing. Consideration of the factors involved in designing of ovens using these heat sources. Infra-Red Systems, Inc.

Circle numbers on Postpaid Card opposite page 144 to obtain free literature

OPPORTUNITY SECTION

Classified Advertising

Automatic polishing machine Packer-Matic #424 complete with 3 vari-speed heads, motors, applicators, etc., top notch condition, wide range of adjustments: Arrow Manufacturing Company, 567 52nd St., West New York, New Jersey.

SOUTH FLORIDA TEST SERVICE, INC.
Testing—Inspection—Research—Engineers
Consultants and specialists in corrosion, weathering and sunlight testing.
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WANTED—Chief Engineer-Paint Finishing Systems:
SPRAY PHOSPHATE WASHERS
PAINT APPLICATION EQUIPMENT
DRY-OFF AND PAINT BAKE OVENS
CONVEYORS
Position with established manufacturer of the above equipment, who is now expanding into a new plant. Salary open for top man. Plant located in Metropolitan New York area. Please send resume. Box 113, c/o Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

WANTED: Distributors and agents for top quality line of cadmium, zinc and copper brighteners, by young and aggressive Chicago-based concern. Liberal commission. Replies held strictly confidential. Write to Box 115, c/o PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.

Buffing Wheel factory, fully equipped. Manufacturing air buffs and conventional type buffs. For Sale. Good Opportunity for sales organization in metal finishing field. Will also consider merger. Write Box 112, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

TWO GAS OVENS
#1 oven, drying area 3 x 4 x 12 ft. with 2-6 ft. long end houses. Conveyor is 52 lin. ft. Now operating; complete, $3,750.00. #2 oven is a single compartment curing unit, swinging doors both ends. Inside 5 x 9 x 6 ft.; $2,500.00 all complete. Contact: **Al Dremel, 122 North St. James, Waukegan, Ill., MAjestic 3-4915.**

HARPERIZER
Large Six Drum Model HH6
Material Handling — Cooling Apparatus
Cost $25,000 new 1960 — Used 35 Hours
ALL OFFERS CONSIDERED
Pressco Casting & Mfg. Corporation
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Capitalize to the hilt on Vibratory finishing with JACKSON VIBRADO

The savings in time and money and the improvement of finishes offered by vibratory finishing of both simple and intricate parts are immense. By all means investigate it. And when you do, be sure you learn all about the JACKSON VIBRADO vibratory finishers . . . the machines which will enable you to capitalize to the very maximum on this method of finishing.

BUILT FOR ULTRA RELIABILITY . . . by the oldest and largest manufacturers of heavy duty vibratory equipment, JACKSON VIBRATORS, INC.

ENGINEERED BY PIONEERS AND ORIGINATORS of some of the best known vibratory finishing equipment.

SOLD AND SERVICED BY NATIONALLY RECOGNIZED EXPERTS IN METAL FINISHING and suppliers of processing media and chemical compounds—ABRADO FINISHING CORP.—whose years of experience is at your service to aid you in achieving the most advantageous processing methods.

FULL WARRANTY—backed by Jackson's long established nationwide Field Service Staff.

Write for the facts that clearly mark VIBRADO Finishing Machines and the expert service behind them as the best means of capitalizing to the *hilt* on the vibratory method of finishing.

SEND US YOUR MOST DIFFICULT SAMPLES and let us demonstrate, entirely without obligation, the remarkable savings in costs and superior finishes that can be obtained with VIBRADO. Accurate data will accompany the return of the sample.

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Models from 1/10 Cu. Ft. to 20 Cu. Ft.

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Some excellent sales territories are still available for qualifying regional distributors

JV-2

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INDUSTRY NEWS

NEW PLANTS

Ultrasonic Industries Opens New England Office

Ultrasonic Industries, Inc., Plainview, L. I., N. Y., has opened an office in Brookline, Mass., to serve New England. Malcolm M. Morgan is manager of the region.

Sherwin-Williams Opens New Research Center

The new Sherwin-Williams Research Center in Chicago recently opened its doors. The Center is at 110th St. and Cottage Grove Ave., a few blocks from the company's large Kensington plant. It is housed in a one-story, 43,000-square-foot building acquired from the Pullman Co. last year.

Outlining the aims and functions of the Center, Arthur B. Holton, technical director for the company, pointed out that the firm's total technical effort is now running at the rate of about $6,000,000 annually.

"This sum supports the work of chemists, engineers and other scientists in forty-five different laboratories," he said.

Holton anticipates that "something over $1,000,000" will be spent on research activities at the Center during the coming year. The bulk of this will go into analytical, paint, resin and mineral products research. The bal-

Sherwin-Williams Research Center in Chicago recently joined company's other research facilities.

ance will be spent by the development and technical service laboratories located at the Center.

COMPANIES

Air Filtration Corporation Formed

Formation of Honan Associates, Inc., Lebanon, Indiana, has been announced by Paul R. Honan, president. The firm will manufacture and distribute air filters incorporating a new principle in self-cleaning units using permanent filter media for use in commercial and industrial air moving and conditioning systems.

Known as the Honan Constant-Flow Air Filter, the design assures a constant air velocity by providing a continuously cleaned filter surface area unobstructed by residue build-up. Depth filtration for extremely high efficiency can be achieved by the addition of up to two inches additional filter medium as a second filtration stage.

Executives of the firm are P. R. Honan, president, Buren C. Crane, vice president and C. Bratton, secretary-treasurer.

Mr. Honan was a founder of the Delpark Corporation, manufacturer of Delpark automatic self-cleaning filters for industrial fluids. He was also a partner in the Industrial Filtration Company.

Mr. Crane was formerly associated with the Indiana Commercial Filters Corporation, Delpark Corporation and the Honan-Crane Corporation. Mr. Bratton was previously with the Delpark Corporation and the Indiana Commercial Filters Corporation.

Ionic Electrostatic Corporation Expands Sales and Service Organization

Ionic Electrostatic Corporation, Garfield, N. J., recently granted a sales and service franchise for the states of New Jersey and New York to Ionic Eastern Corporation, Rutherford, N. J.

The new organization is staffed with 10 technical representatives trained at Ionic Electrostatic Corporation's Research Laboratory.

John Sedlacsik, Jr., president of Ionic Electrostatic Corporation, reports that Ionic Eastern Corporation is equipped with centrifugal-type electrostatic hand guns for demonstration purposes.

A. C. Fuller Honored by Brush-Manufacturing Industry

Alfred C. Fuller, founder and chairman of the board of The Fuller Brush Company, recently received the first Distinguished Service Award of the American Brush Manufacturers Association.

A.B.M.A. President Philip A. Singleton, president of Pro-phy-lac-tic Brush Co., presented Mr. Fuller with a scroll citing Mr. Fuller's numerous achievements in business, civic and educational affairs. The citation states, "Throughout his career, Alfred Carl Fuller has brought distinction and respect to the brush industry." A sterling silver tray, suitably inscribed, was also presented to Mr. Fuller.

BRUKO . . The only company in America with a full line of processing materials. Order your specially formulated products for cleaning, buffing, and polishing from
BRUCE PRODUCTS COMPANY
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SHOP BULLETIN F60-17
Discontinuation
Polishing & Buffing Operations
August 8, 1960
Effective immediately all polishing and buffing operations on AMES MAID items, prior to plating, are to be discontinued.
C.D. Memel

Ames said goodbye completely to polishing and buffing when SUPERLUME came along

Ray Schlotterbeck exhibits a few Ames products plated with Superlume. Above him, another testimonial to Superlume's superiority . . . Shop Bulletin F60-17.

Reports RAY SCHLOTTERBECK,
Plating Superintendent for the world's largest maker of Shovels and Garden Tools (since 1774), as well as famous AMES MAID and AMES AIRE Tubular Furniture.

One month after Superlume bright nickel bath went into operation at O. Ames Company, Parkersburg, W. Va., the official bulletin shown declared *all* polishing and buffing there no longer necessary.

Ames had been polishing 5000-6500 parts a day, first switched to Superlume just to give its products added eye-appeal. When Superlume produced a greater depth of color *without* polishing than previous baths gave *with*, Ames got a tremendous bonus: *A reduction in its over-all finishing costs of 10 to 12%.*

"I never saw a bath that levels better," says Ray Schlotterbeck, "nor one that throws or brightens better, either." And Ames sales people add, "Our product quality was never higher."

Results like these are common with Superlume. Ask H-VW-M for full details.

H-VW-M

Progress in metalfinishing through advanced processes • equipment

Hanson-Van Winkle-Munning Company, Matawan, New Jersey
Offices in Principal Cities
Alert Supply Company is H-VW-M in the West
Los Angeles • San Francisco

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C. W. Ostrander Completes European Tour of Allied Licensees

Charles W. Ostrander

Charles W. Ostrander, technical assistant to the president, Allied Research Products, Inc., Baltimore, recently completed a 7-week tour of Europe, visiting Allied Research licensees and their customers. Working in cooperation with Sture Granberger, the Allied Research agent for the European countries, Mr. Ostrander made calls in Sweden, West Germany, Italy, France, England and Switzerland, and exchanged technical information and views on metal finishing products and practices with many leading European manufacturers.

While in Switzerland, Mr. Ostrander—a member of the American Electroplaters' Society—presented a paper entitled "Chromate Conversion Coatings for Hot Galvanized Surfaces." This was given at the 6th International Galvanizing Conference held in Interlaken under the auspices of the European General Galvanizers Assn.

Enjay To Expand Solvents Capacity

Enjay Chemical Company, a Division of Humble Oil & Refining Company, recently announced plans to expand its line of solvents and chemical intermediates. New production facilities will be added at Humble's Bayway, N. J., refinery.

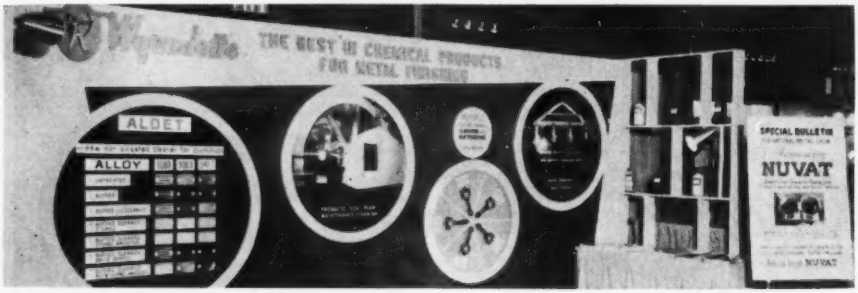
According to R. K. Dix, vice president product management of Enjay, methyl isobutyl ketone is the principal product that will be made in the new plant. "The addition of this ketone (MIBK) to Enjay's product line will strengthen the company's position as a major marketer of solvents, including alcohols, ethers, ketones and esters," Mr. Dix said.

MIBK is used in the manufacture of lacquers, organic coatings, and adhesives. It is also used in lube-oil dewaxing processes.

The new plant at Bayway is expected to be completed and on stream by the middle of 1962.

Wyandotte's Display at Metal Show

Wyandotte Chemicals' Booth at the Metal Show in Detroit featured Nuvat, a new non-scumming soak cleaner based on synthetic detergents. Nuvat readily removes buffing compounds, drawing oils and similar soils, elimi-



Wyandotte booth at Detroit Metal Exposition displayed metal cleaners, maintenance materials.

nates streaks, "clouds" and blisters on metal surfaces.

Also featured was Nordall, an emulsion spray cleaner that provides rust protection between operations; Aldet, a silicate-free, non-etching soak cleaner for aluminum and other metals; and Wyandotte products for Plant Maintenance Cleaning.

In attendance were Ford Ballantyne, Jr., vice president and general manager; F. H. Tholen, general sales manager; P. N. Burkard, manager I. R.&A. Dept.; T. S. McCormick, Detroit district sales manager and E. J. Kubis, manager, metal finishing sales.

Zinc Paint Doubles as Navy Detective

December 19, 1960 will go down in naval history as the day the most destructive Naval Shipyard fire took place. It seriously damaged the aircraft carrier Constellation, then under construction at New York Naval Shipyard and 90 per cent complete. Fifty workmen were killed, and several hundred more were injured.

The fire resulted from the accidental leakage and ignition of several hundred gallons of jet fuel on the hangar deck; total damage was estimated at $47 millions, and a 7-month delay in completion of the ship resulted.

Through a careful examination of effects of the fire on construction materials and paint in different parts of the ship, investigators were able to determine not only the location of the hottest flames, but also some indication of the actual temperatures attained. For example, disintegration of thin aluminum bulkheads showed that temperatures in their areas must have been at least 1100 deg. F.

Other estimates of temperatures reached were based on judicious evaluation of the condition of zinc chromate paint normally used by the navy for corrosion control of steel bulkheads, piping and machinery. Chart shows temperature-condition correlation.

Zinc Chromate Paint Condition	Deg. F.
blistered but clinging tightly	200-250
blistered, 50% can be wiped off by hand	300-400
can be wiped off by hand	500-600
stripped clean	over 600

This data proved extremely useful in replacement of fire-damaged pipe, which was made of various materials, including carbon steel, copper-nickel, brass, aluminum. If the zinc chromate paint on the pipe showed that it had not reached a temperature limit set well under that which would adversely affect its metallurgical properties, it was usually retained. Otherwise, it was marked for replacement.

Sethco To Show Filters at Chemical Industries Exposition

The Midas SUBLQ Ion Exchanger for reclaiming gold and the LAI miniature filter systems for laboratory and pilot plant use are just two items Sethco Manufacturing Corporation, Merrick, N. Y., is planning to exhibit at the 28th Exposition of Chemical Industries in New York's Coliseum (November 27-December 1).

At Booth 293, Sethco will also feature filter systems for filtering chromic acid at temperatures up to 200 deg.

(continued)

"GRIPALLOY"

. . . Attractive satin sheen ETCHING PRIMER in black and colors . . . Often used as finish coat . . . Air dries in minutes . . .

. . . Amazing tight adhesion to 25 different metals as reported by a large electrical manufacturer.

. . . Excellent resistance to Salt Spray, Gasoline, and Solvents . . .

TENAX, Newark, N. J.
Lacquers—Enamels
Synthetics—Vinyls

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F. and other industrial solutions to 250 deg. F. with complete corrosion resistance. Filter chambers and pumps are of polypropylene, lucite, epoxy, PVC, stainless steel 316 with fittings of SS 316, glass epoxy, hastelloy or titanium.

All PVC carboy pumps for transferring and pumping corrosive acids from 15- and 30-gallon carboys will be on view, as well as other all-plastic and stainless steel pumps, centrifugal or self-priming types, all available as separate units.

Sethco's representatives will be in attendance headed by Jules L. Englesberg, chemical engineer and Walter J. Otto, production engineer.

Dry Clime Appoints Chicago Rep

D. J. Pollingue, Jr.

D. J. Pollingue, Jr., has been appointed sales representative for the driQuik line of ceramic-type electric infrared industrial drying ovens, manufactured by the Dry Clime Lamp Corp., Greensburg, Ind. His territory includes Chicago and the northern half of Illinois.

Mr. Pollingue offers free field testing service, with portable field-test drying equipment brought into any plant upon request for in-plant demonstrations with the plant's products and personnel. His sales office is Rm. 301, 4010 W. Madison St., Chicago, Ill.

NEW POSITIONS

Raoul J. Casciari has been named manager of product development for the Electrical Products Division of **Corning Glass Works.** He succeeds **S. Joseph Muccigrosso,** appointed production superintendent at the company's Central Falls, R. I., plant.

★ ★ ★

Major top management changes have been announced by **Metal & Thermit Corporation.**

H. E. Martin has become chairman and chief executive officer. Replacing him as president is **Charles J. Beasley,** formerly vice president and secretary of the Corporation.

H. W. Buchanan, previously a vice president, has been named executive vice president.

H. W. Buchanan

Charles J. Beasley

H. E. Martin

Robert F. Morgan

Robert F. Morgan has joined the Detroit sales staff of **Pangborn Corporation,** Hagerstown, Maryland.

Stephen Basarab has been appointed plant manager of **Metal & Thermit Corporation's** detinning plant in Carteret, N. J., according to J. K. Parks, vice president and general manager, M&T's Detinning Division.

★ ★ ★

Metals & Controls Inc., a corporate division of **Texas Instruments Incorporated** has appointed **Clifford J. Grube** head of its newly organized Jewelry Products Section.

★ ★ ★

James E. Duff has been elected vice president in charge of marketing of the **Cuno Engineering Corporation,** Meriden, Conn., a subsidiary of **American Machine & Foundry Company.**

★ ★ ★

Frederick Gumm Chemical Co. Inc. of Kearny, N. J., has appointed **William H. Brown** technical sales representative for the Philadelphia-Trenton-Camden area, as well as for Maryland and Delaware.

★ ★ ★

Christopher J. McMahon appointed sales representative in greater New York City for **The Stanley Chemical Company,** East Berlin, Connecticut, a subsidiary of The Stanley Works.

★ ★ ★

Paul A. Fodor, Jr., appointed director of sales for the chemical division of **Pittsburgh Plate Glass Company.**

Mr. Fodor, formerly assistant director of sales, succeeds **W. F. Newton** who recently was appointed director, marketing planning, for Pittsburgh Plate's merchandising division.

★ ★ ★

Dr. Alexander Ross appointed European technical representative for **M&T Chemicals AG.**

Dr. Ross, who will be headquartered in Zug, Switzerland, previously served as supervisor of organic research at Metal & Thermit's research center in Rahway, N. J.

Clifford J. Grube

Stephen Basarab

James E. Duff

William H. Brown

C. J. McMahon

Charles J. Martin

Kelite Corporation appointed **Charles J. Martin** eastern regional sales manager.

Walter Friede

Paul R. Stuart

W. A. Dickinson, Jr.

Dr. M. M. Beckwith

M. F. Schaible

Dr. W. E. Matheson

Dr. Willard E. Matheson has joined **Acoustica Associates, Inc.**, of Los Angeles as director of engineering for the Advanced Systems Division.

R. O. Hull & Company, Inc., Cleveland, named **Dr. Merton M. Beckwith** vice president and technical director, **Paul R. Stuart** vice president and general manager and **Walter Friede** manager of the Customer Service Laboratory.

★ ★ ★

Warren A. Dickinson, Jr. has joined the sales engineering staff of **J. O. Ross Engineering, Division of Midland-Ross Corporation**, New York, New York.

★ ★ ★

Five appointments have been announced by **Commercial Filters Corporation** following a merger with RAD, Inc., a Cincinnati research and development firm.

Michael F. Schaible succeeded **Robert L. Fielding** as president and chief executive officer. Mr. Fielding will serve as Vice-Chairman of the board.

Alfred F. Duemler, Jr. has been named vice president and treasurer of Commercial Filters Corporation. **Carl F. Holland** is now general sales manager.

E. John Van Lier is now chief product engineer.

Fred C. Valentin has been named chief manufacturing engineer.

Charles T. Rose was appointed chief industrial engineer.

★ ★ ★

William D. Morrison has joined **Hooker Chemical Corporation** as general manager of the company's newly-formed International Division. This fifth corporate Division is at company headquarters in New York.

★ ★ ★

Oakite Products, Inc., appointed **Richard F. Latt** and **Donald F. Moulton** members of the company's field service organization.

Mr. Latt will serve the metal industries in South Buffalo, N. Y.

Mr. Moulton has been assigned to the state of Vermont.

Arnold Substad, general manager of **Despatch Oven Co.,** Minneapolis, has been made a vice president and **Lloyd Johnson** has been appointed vice president in charge of manufacturing.

★ ★ ★

A. John Cornish, Jr. and **James L. Dickens** appointed sales engineers by **Enthone, Inc.,** New Haven, Conn., subsidiary of American Smelting and Refining Company. Mr. Cornish will represent Enthone in the eastern Pennsylvania, Maryland and Delaware area and Mr. Dickens will handle the Buffalo, N. Y. district.

★ ★ ★

Leroy Camel elected vice president of **Detrex Chemical Industries, Inc.,** Detroit. Mr. Camel joined Detrex in 1936 as technical director of the Alkali Division. His recent assignment has been sales manager of the Chemical Processing Division. He will continue with this responsibility.

★ ★ ★

Hanson-Van Winkle-Munning Company appointed **Fredrick A. Pitschke** sales manager, Electrochemical Machining Division. Mr. Pitschke reports to Warren S. Wilkinson, president, and is responsible for developing markets and sales for the Company's electrochemical machining process.

★ ★ ★

Fostoria Corporation, Fostoria, Ohio recently appointed **Ken D. Rudolph** area manager for engineered products — electric infrared processing equipment. Mr. Rudolph will represent Fostoria in western Pennsylvania, West Virginia and part of Maryland.

★ ★ ★

Allan Elston named eastern regional sales manager for **The Diversey Corporation.** His headquarters will be at the company's Newark, N. J., offices.

Arnold Substad

Lloyd Johnson

A. John Cornish, Jr.

James L. Dickens

Leroy Camel

Frederick A. Pitschke

Robert C. Ochs named chief accountant of the **Lord Chemical and Equipment Division of Wheelabrator Corporation,** York, Pa.

Jack L. Goodman

William J. Miller

Robert P. Jones

Rollin M. Russell

Chester G. Borlet

M. A. McGinnis

Dr. Elizabeth B. See has joined **Acoustica Associates, Inc.**, as a senior scientist in the Research Department.

William J. Miller appointed director of sales personnel and training of **Mystik Adhesive Products, Inc.**, Chicago.

★ ★ ★

Jack L. Goodman appointed assistant sales manager of **Dry Clime Lamp Corp.**, Greensburg, Indiana.

★ ★ ★

Robert P. Jones, New England division manager of **Oakite Products, Inc.** since 1954, has been assigned to the firm's New York headquarters. Mr. Jones will do staff work, reporting directly to the president, John A. Carter.

★ ★ ★

Rollin M. Russell has been elected president of **Acoustica Associates, Inc.**, Los Angeles.

★ ★ ★

Chester G. Borlet appointed plating products specialist for the **Plating Division of Metal & Thermit Corporation.**

Until recently Mr. Borlet was technical director of Grand Rapids Brass Company, Grand Rapids, Mich.

At the 1961 national convention of the American Electroplaters' Society, in June, Mr. Borlet was elected to the presidency of the society for 1961-1962.

★ ★ ★

Mark A. McGinnis has been promoted to vice president-sales of **The Singleton Co.**, Cleveland, Ohio.

Mr. McGinnis has managed sales for Singleton since the firm reorganized in November, 1960.

★ ★ ★

J. W. Noyce has been appointed by **Northwest Chemical Company**, Detroit, to serve accounts in the Chicago area. He will work in cooperation with the present staff there.

Emil Pieper has been named quality manager of the **Schlegel Manufacturing Company,** Rochester, N. Y.

★ ★ ★

Charles Bartell appointed director of research and development of **Mystik Adhesive Products, Inc.**

★ ★ ★

Naming of a new district sales manager and reassignment of two others recently has been announced by the **J. B. Ford Division of Wyandotte Chemicals Corp.**

John J. Wilson has been appointed as the Division's new district sales manager for its New York territory.

James S. Hubbard, formerly the company's New York manager, transfers to manage Cincinnati operations.

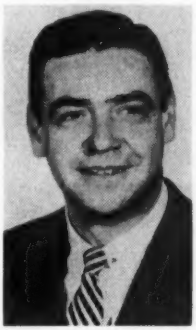
E. S. Schmeling moves from Cincinnati to fill a district sales manager vacancy in Chicago.

★ ★ ★

Gerald P. Glab appointed technical engineer in cleaning and plating service by **Belke Manufacturing Company,** Chicago.

Charles Bartell

Emil Pieper



James S. Hubbard

John J. Wilson

George F. Schuning

Gerald Glab

Alex J. Szabo

Evans S. Schmeling

George F. Schuning was named general sales manager of the **J. O. Ross Engineering Division, Midland-Ross Corporation.**

Alex J. Szabo has been assigned a new position by **Pangborn Corporation:** sales engineer in the Cleveland district.

Harry J. Bolwell

Louis Schlossberg

Oscar Maxstadt

Davis G. Taylor

Robert M. Burford

Bernard C. Voltz

Julio J. Usera has joined the recently formed International Division of **Hooker Chemical Corporation** in New York City.

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Harry J. Bolwell elected vice president of **Midland-Ross Corporation** and general manager of the company's Surface Combustion Division. In his new position, Mr. Bolwell succeeds **Eugene P. Heiles** who will retire from the company early next year.

★ ★ ★

Detrex Chemical Industries, Inc., has appointed **Louis Schlossberg** as research manager, Chemical Processing Division.

★ ★ ★

P. George Simon named technical manager of **Diversey-Wilmington,** Sao Paulo, Brazil, a subsidiary of **The Diversey Corporation,** Chicago.

He succeeds **W. Bibikoff,** who was recently named general manager of the Brazilian subsidiary.

★ ★ ★

Robert M. Burford, Oscar Maxstadt, and **Bernard C. Voltz** have been appointed to newly created equipment sales posts in the **Metal Processing Department, Pennsalt Chemicals Corporation.**

★ ★ ★

Davis G. Taylor has been appointed sales engineer by **Pangborn Corporation.** Mr. Taylor will operate out of Alamo, California as a sales engineer with Pangborn's West Coast district.

George Crabb

William Schreiber

The appointments of **George Crabb** to sales engineer and **William Schreiber** to sales correspondent have been announced by **Schlegel Manufacturing Company,** Rochester, N. Y.

Mr. Crabb will be responsible for sales and service in several midwestern states.

Mr. Schreiber, a new employee, will take over Mr. Crabb's former position.

★ ★ ★

Borlet Is Guest At Dallas-Ft. Worth Annual

Chet Borlet, president of the American Electroplaters' Society, was the honored guest at the recent Dallas-Ft. Worth Annual Meeting and Banquet in the Statler-Hilton Hotel, Dallas.

Highlights of the evening included presentation of a check for research on Vapor Deposition, A.E.S. Research Project 20, to Dr. R. L. Hoyle, research fellow, by Myron E. Browning, co-chairman of Project 20. President Borlet installed new branch officers.

National President Chet Borlet (center) presents gavel to R. F. Howard, new president of Dallas-Ft. Worth Branch. Retiring Branch President W. L. Aves looks on. (Photograph courtesy Dallas-Ft. Worth Branch, A.E.S.)

Detroit A.E.S. Annual December 1-2

Frank L. LaQue

The Detroit Branch will hold its annual educational session and annual banquet at the Statler Hilton Hotel in Detroit on Friday evening, December 1 and Saturday evening, December 2.

This will be a major event for the Detroit Branch, as it is also observing its 50th Anniversary.

On Friday evening, Frank L. LaQue, vice president of International Nickel Company, Inc., and manager of Inco's Development and Research Division

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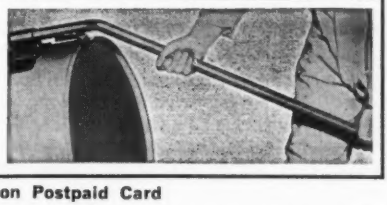

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will speak on "What We Know and Do Not Know About Corrosion." A.E.S. National President Chester G. Borlet will be technical chairman. Other national officers of the A.E.S. will also be present to honor the branch on its Golden Anniversary.

The banquet on Saturday evening includes a floor show and dancing. A cocktail party sponsored by a number of companies of the Metal Finishing Suppliers' Association will precede the event.

Norman A. Smith of Electro Finishing Industries, Inc., is chairman of the December party.

SOCIETIES

Ostrenga Named To Head Tape Council Committee

Stan L. Ostrenga has been elected chairman of the Simplified Practices Committee of the Pressure Sensitive Tape Council.

Mr. Ostrenga, national industrial sales manager for Mystik Adhesive Products, Inc., Chicago, was elected for a two-year term.

The council is a national trade association of manufacturers who produce self-sticking tape.

Tape Manufacturers Elect Cerwin

Leonard V. Cerwin, director of technical services, Mystik Adhesive Products, Inc., Chicago, has been elected to the Steering Committee of the Technical Group of the Pressure Sensitive Tape Council. The Steering Committee is an advisory body for the national organization of tape manufacturers.

A.S.T.M. Changes Name

The name of the American Society for Testing Materials has been officially changed to American Society for Testing *AND* Materials.

In announcing this change, ASTM President Miles N. Clair said, "The inclusion of the word 'and' in the Society's name places added emphasis on the Society's research work in seeking knowledge of the nature of materials."

Engineering Organizations Move to U.N. Plaza

The new United Engineering Center on United Nations Plaza in New York City recently became the largest concentration of professional engineering societies in the Free World. Nineteen organizations are the initial occupants, with room available for others in the future. The occupants include the five "Founder Societies" — the American Society of Civil Engineers, the American Institute of Mining, Metallurgical, and Petroleum Engineers, The American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Institute of Chemical Engineers.

Others are: United Engineering Trustees, Inc., American Institute of Consulting Engineers, American Institute of Industrial Engineers, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, American Welding Society, Engineering Foundation, Engineering Index, Engineering Societies Library, Engineers Council for Professional Development, Engineers Joint Council, Illuminating Engineering Society, Society of Women Engineers, The Municipal Engineers of the City of New York, and Welding Research Council.

These initial occupants represent a total world-wide membership of 300,000. The Center is owned and operated by the United Engineering Trustees, Inc., agency of the five "Founder Societies."

Zinc-Rich Paint Research Program Begins

A research project to improve the characteristics of zinc-rich paints recently has been awarded to three

manufacturers of zinc-dust pigments in England, according to Dr. Schrade F. Radtke, research director of American Zinc Institute's Expanded Research Program.

Most of the practical work will be carried out in the research laboratories of the Imperial Smelting Corporation, Ltd. at Avonmouth, with the assistance of Amalgamated Oxides (1939) Ltd. of Dartford, and Durham Chemicals Ltd. of Birtley, he said.

First target of the investigation will be development of better paints for priming of automobile underbodies, Mr. Radtke said. He noted that zinc-rich paints are already finding extensive use in the U. S. to help combat automotive corrosion problems. Corrosion is of increased significance since the increased adoption of unitized auto bodies here.

Research goals include development of zinc-rich paint formulations that will provide better adhesion, flexibility and welding characteristics than presently available. This will be followed by research on zinc-rich paints for structural steelwork and marine applications.

NECROLOGY

Howard J. Daly

Howard J. Daly, 64, vice president and director of Norton Company, died on October 7 at Niagara Falls.

He was general manager of Norton's electric furnace plants at Chippawa, Ontario; Cap-de-la-Madeleine, Quebec; and Huntsville, Alabama.

MEETINGS of INTEREST to FINISHERS

Nov. 16. Installation Meeting, Central Iowa Branch, A.E.S.. Roosevelt Hotel, Cedar Rapids, Iowa.

Dec. 1-2. Annual Educational Meeting and Banquet, Detroit Branch, A.E.S., Statler-Hilton Hotel, Detroit, Michigan.

Dec. 15-16. Annual Educational Session and Banquet, Newark Branch, A.E.S., Robert Treat Hotel, Newark, New Jersey.

Dec. 16. Dinner Dance, Bridgeport Branch, A.E.S., Stratfield Hotel, Bridgeport, Conn.

Jan. 13. Ninth Interim Meeting, A.E.S. (National), Hotel Marott, Indianapolis, Indiana.

Jan. 20. Annual Meeting, Grand Rapids Branch, A.E.S., Pantlind Hotel, Grand Rapids, Mich.

Jan. 27. Annual Educational Session and Banquet, Chicago Branch, A.E.S., Conrad Hilton Hotel, Chicago, Ill.

Feb. 5-9. Committee Week, American Society for Testing and Materials, Statler-Hilton, Dallas, Texas.

Feb. 9-10. 4th Annual Dixie Regional Educational Meeting, Dinkler-Plaza Hotel, Atlanta, Ga.

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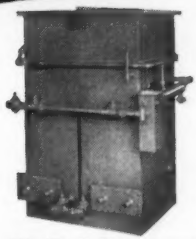
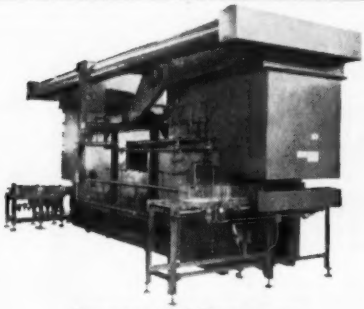
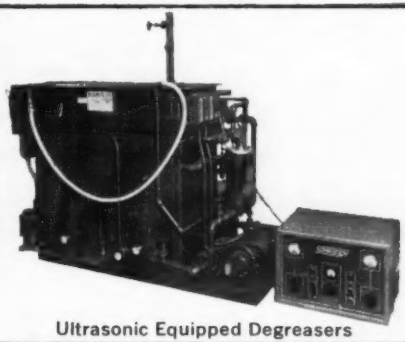


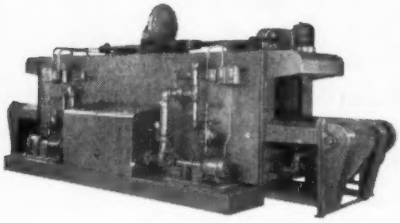
Dip Tank Degreasers



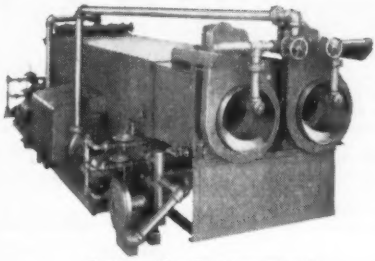
Conveyorized Degreasers



Ultrasonic Equipped Degreasers



Conveyorized Belt Type Parts Washers



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